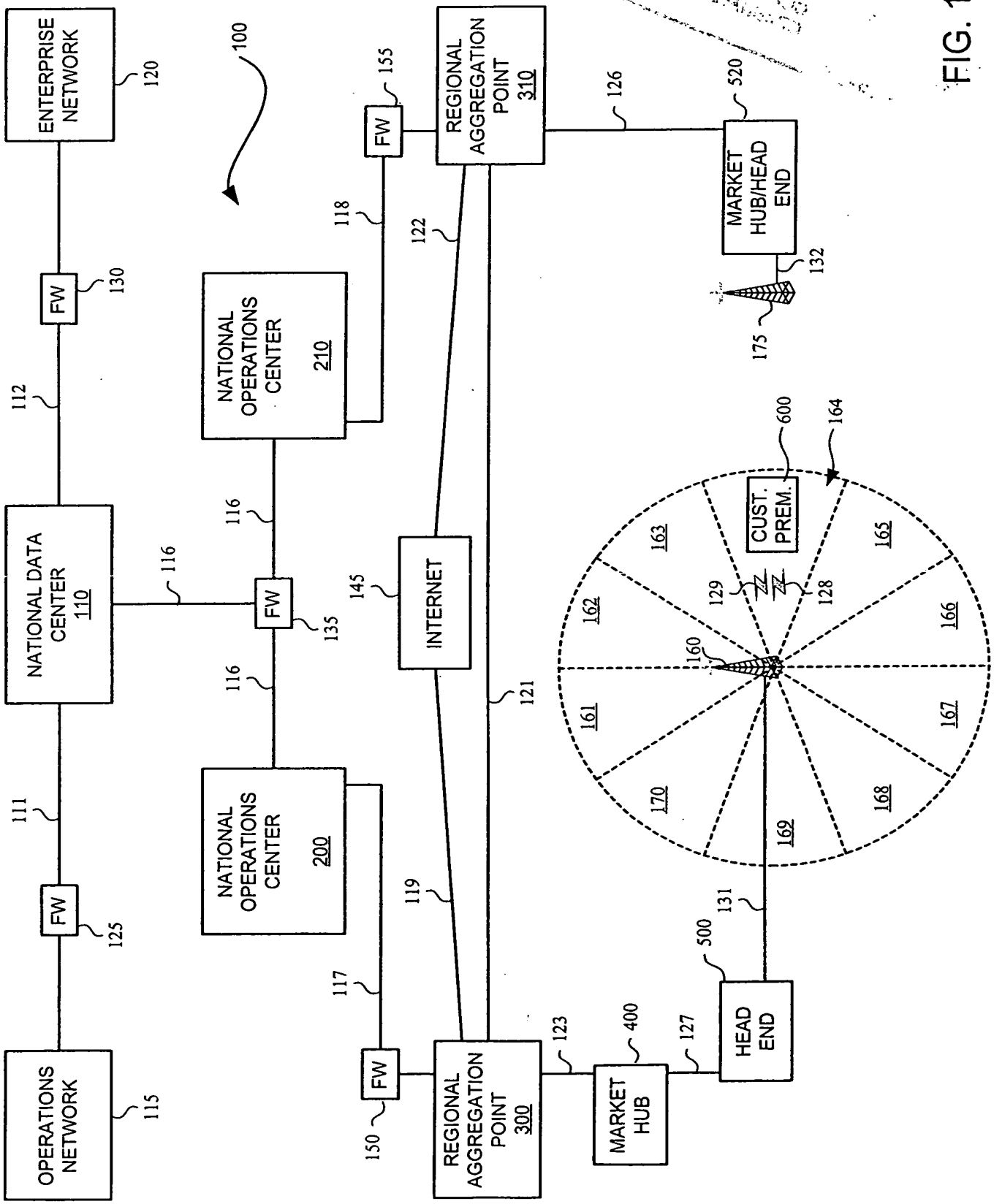
ENTERPRISE NETWORK
120
100
FW
130
112
NATIONAL DATA CENTER 110
116
FW
135
116
NATIONAL OPERATIONS CENTER 210
118
FW
155
REGIONAL AGGREGATION POINT 310
126
520
MARKET HUB/HEAD END
132
175
122
145
INTERNET
121
600
164
CUST. PREM.
163
165
129
128
162
166
160
161
167
170
168
169
111
FW
125
OPERATIONS NETWORK
115
NATIONAL OPERATIONS CENTER 200
119
117
FW
150
REGIONAL AGGREGATION POINT 300
123
400
MARKET HUB
127
500
131
HEAD END

FIG. 1

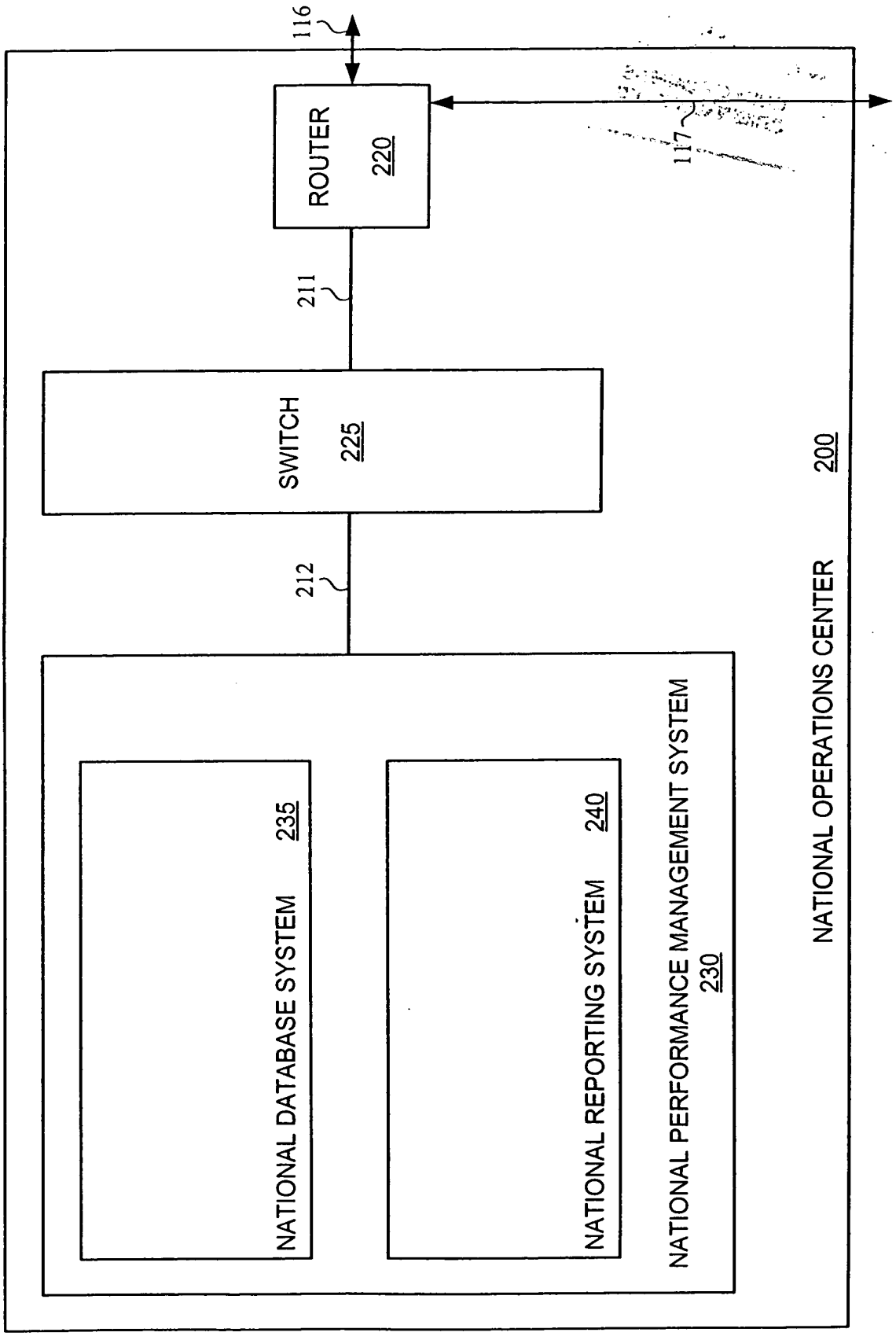

FIG. 2

20540.35650

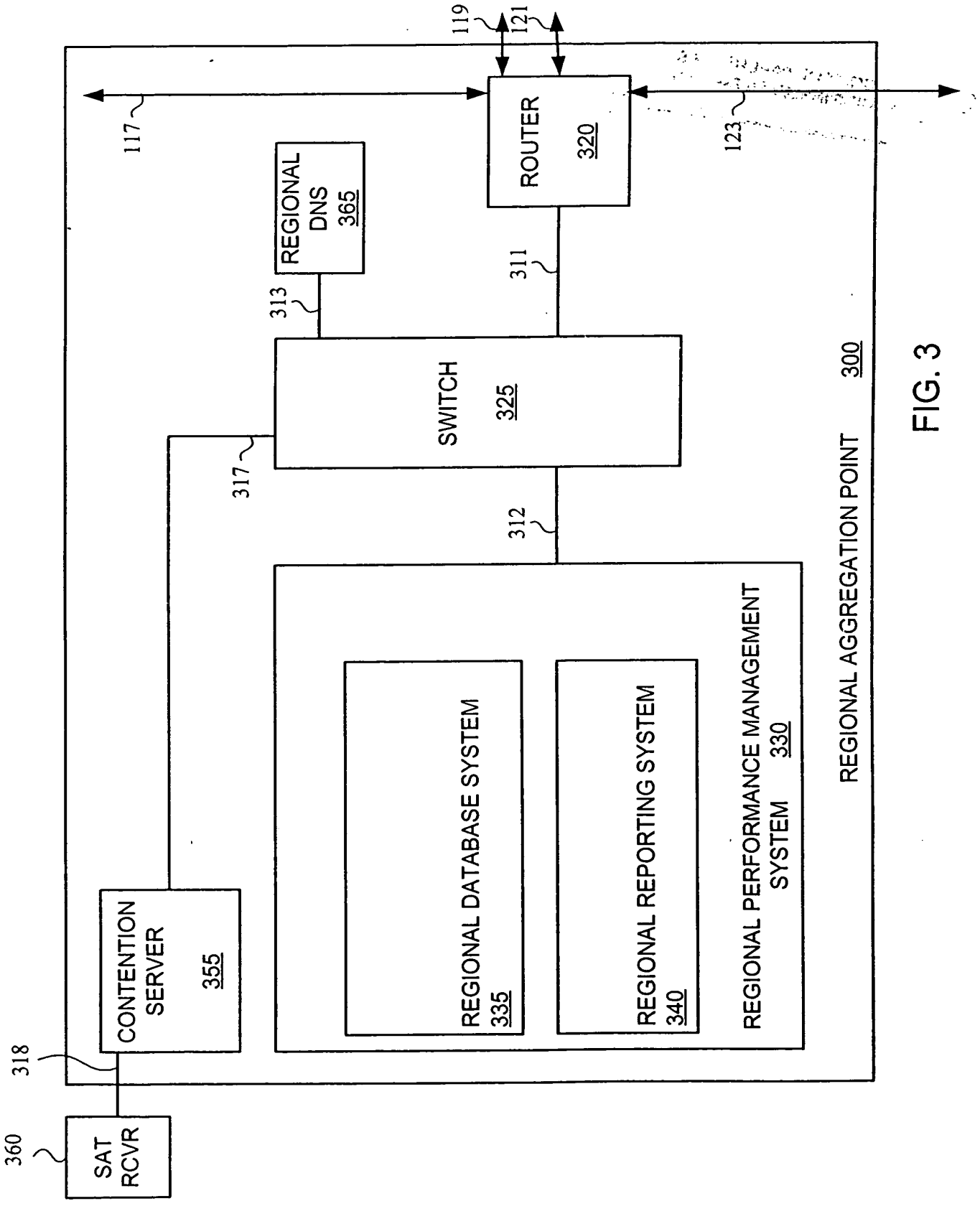

FIG. 3

20020160

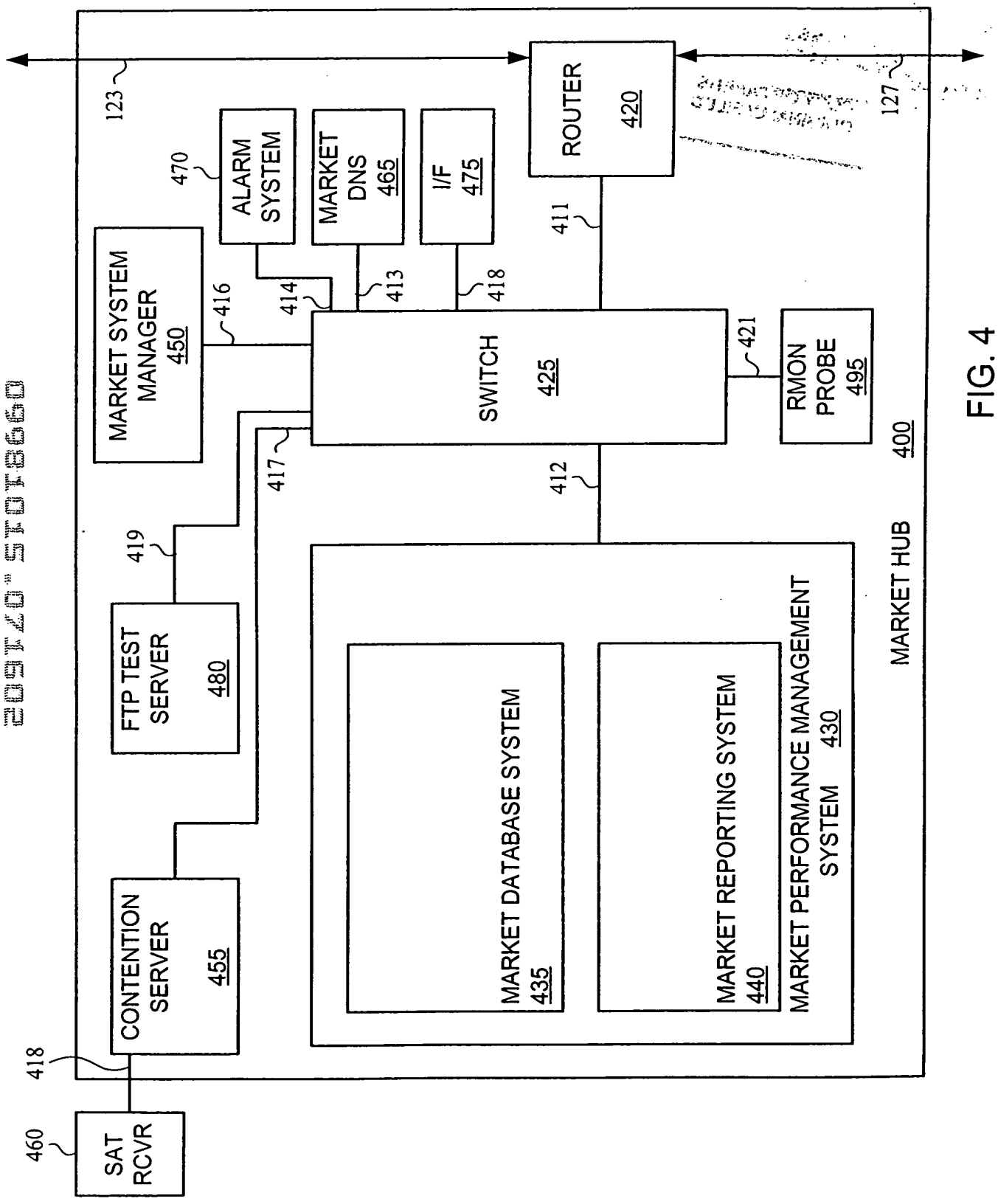
MARKET HUB
400
123
127
ROUTER
420
ALARM SYSTEM
470
MARKET DNS
465
I/F
475
MARKET SYSTEM MANAGER
450
SWITCH
425
RMON PROBE
495
FTP TEST SERVER
480
CONTENTION SERVER
455
SAT RCVR
460
MARKET DATABASE SYSTEM
435
MARKET REPORTING SYSTEM
440
MARKET PERFORMANCE MANAGEMENT SYSTEM
430
411
412
413
414
416
417
418
419
421

FIG. 4

20020136860

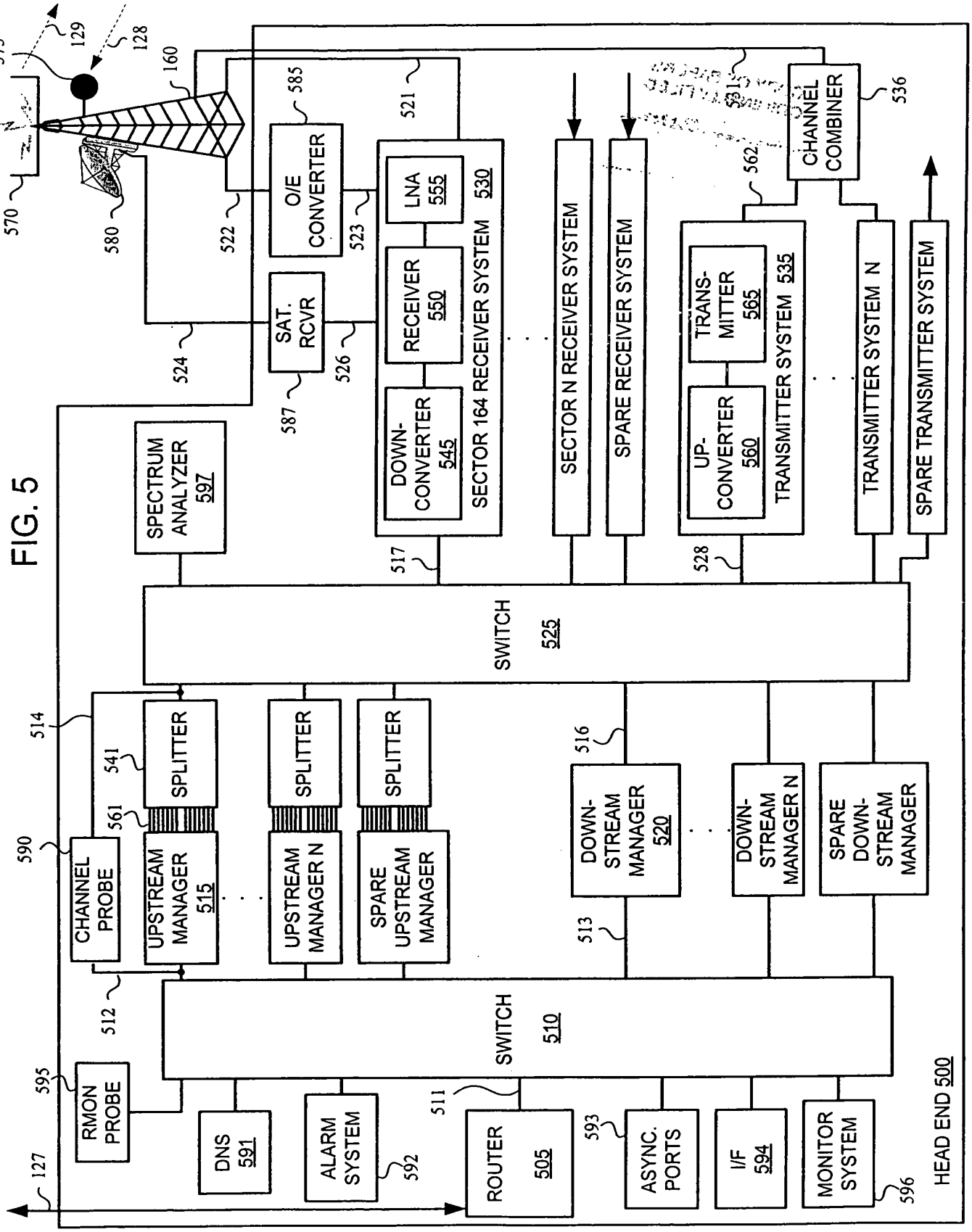

FIG. 5

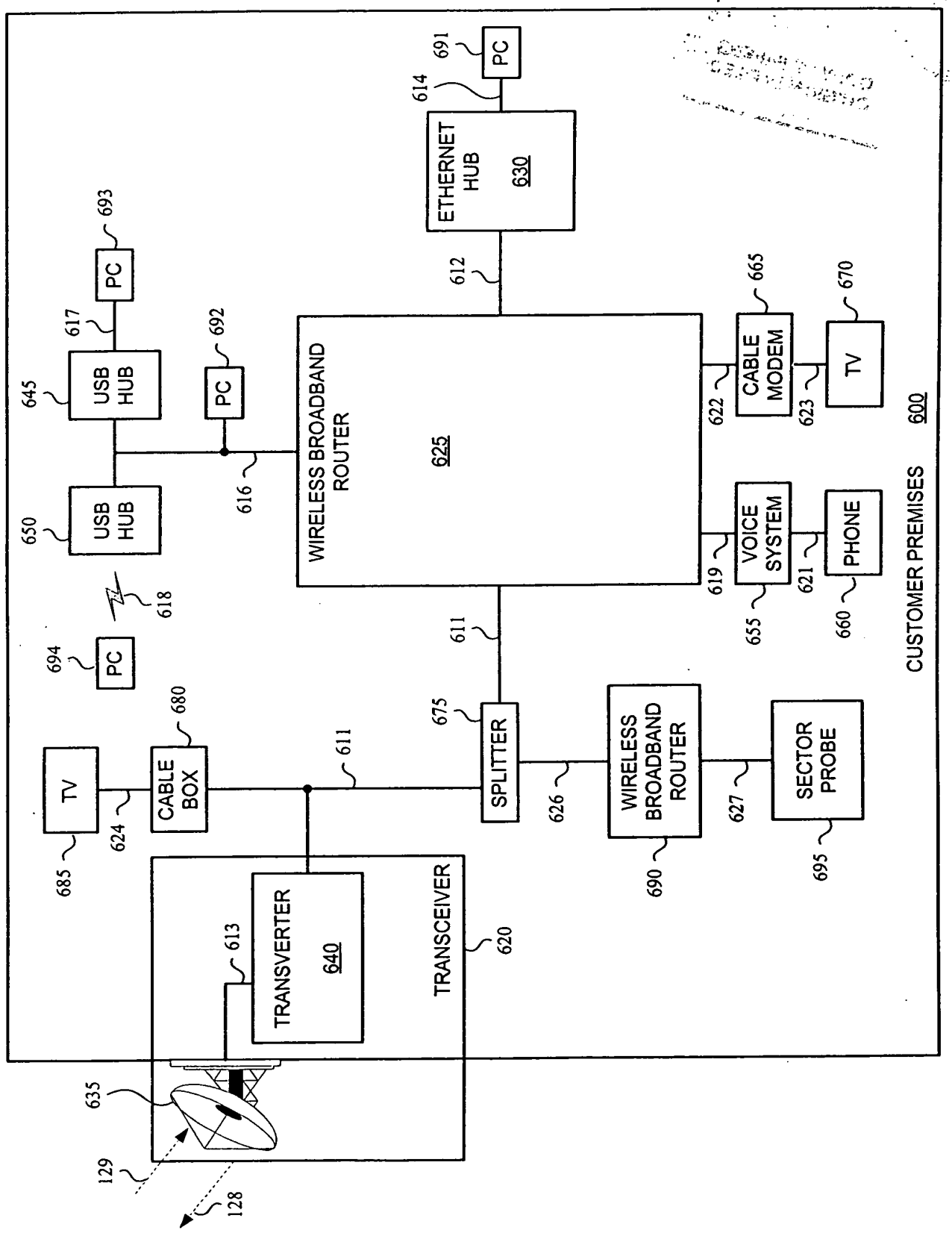
CUSTOMER PREMISES 600
ETHERNET HUB 630
WIRELESS BROADBAND ROUTER 625
CABLE MODEM
VOICE SYSTEM
PHONE
TV
PC
USB HUB
CABLE BOX
SPLITTER
WIRELESS BROADBAND ROUTER
SECTOR PROBE
TRANSVERTER 640
TRANSCEIVER 620
611
612
613
614
616
617
618
620
622
623
624
625
626
627
635
645
650
655
660
665
670
675
680
685
690
691
692
693
694
695
128
129

FIG. 6

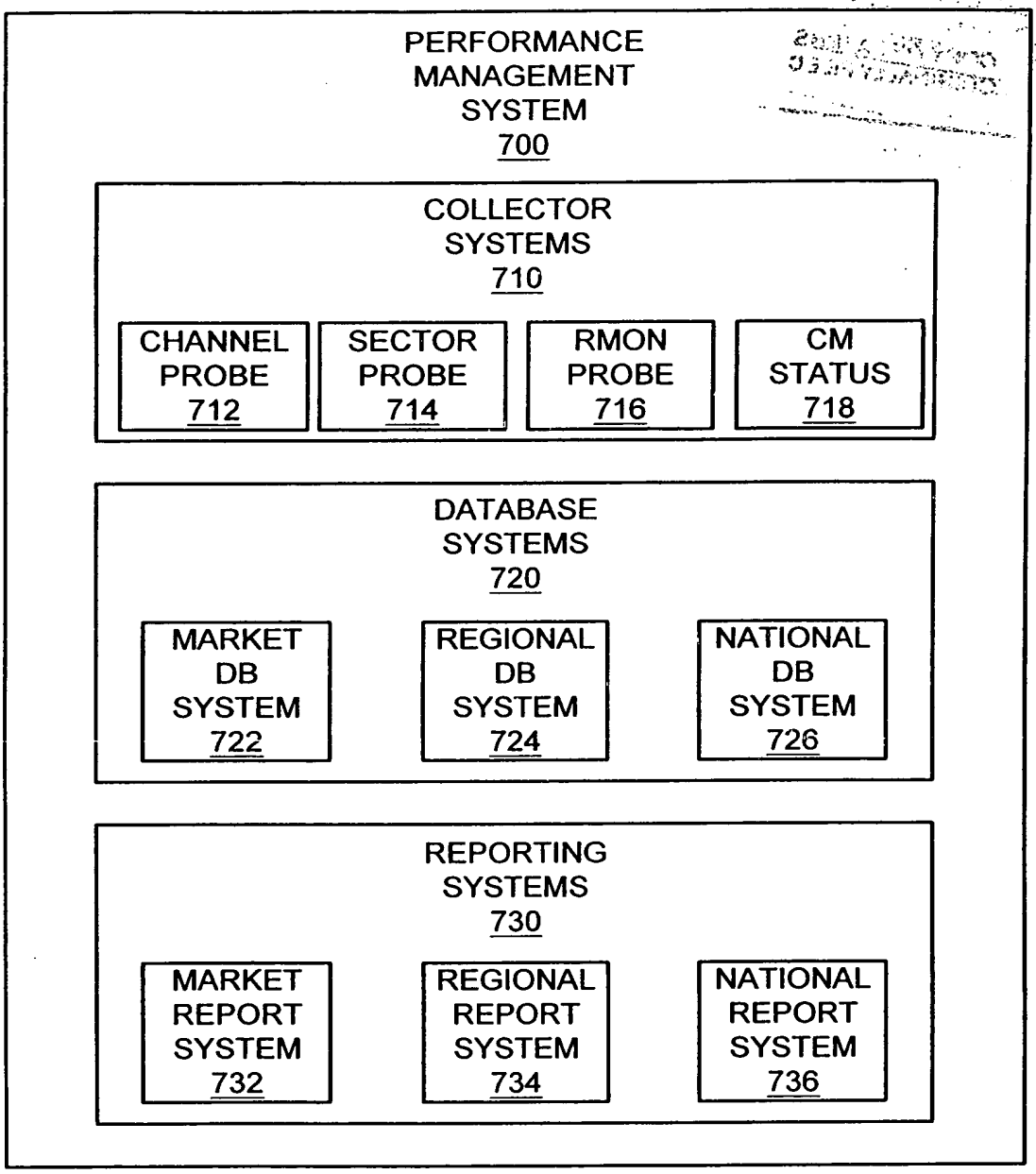
PERFORMANCE MANAGEMENT SYSTEM 700
COLLECTOR SYSTEMS 710
CHANNEL PROBE 712
SECTOR PROBE 714
RMON PROBE 716
CM STATUS 718
DATABASE SYSTEMS 720
MARKET DB SYSTEM 722
REGIONAL DB SYSTEM 724
NATIONAL DB SYSTEM 726
REPORTING SYSTEMS 730
MARKET REPORT SYSTEM 732
REGIONAL REPORT SYSTEM 734
NATIONAL REPORT SYSTEM 736

FIG. 7

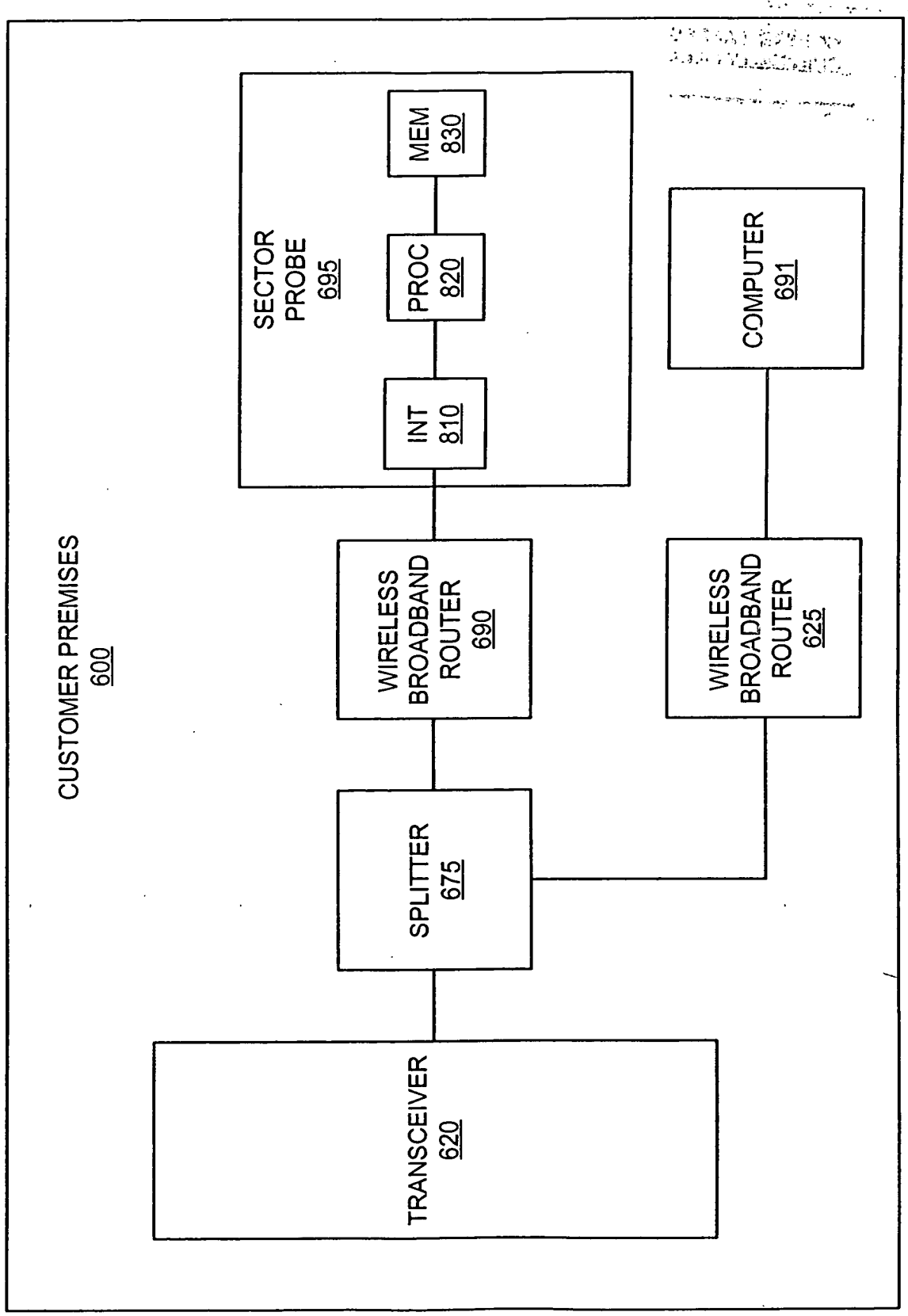
CUSTOMER PREMISES
600
SECTOR PROBE
695
MEM
830
PROC
820
INT
810
WIRELESS BROADBAND ROUTER
690
SPLITTER
675
TRANSCEIVER
620
COMPUTER
691
WIRELESS BROADBAND ROUTER
625

FIG. 8

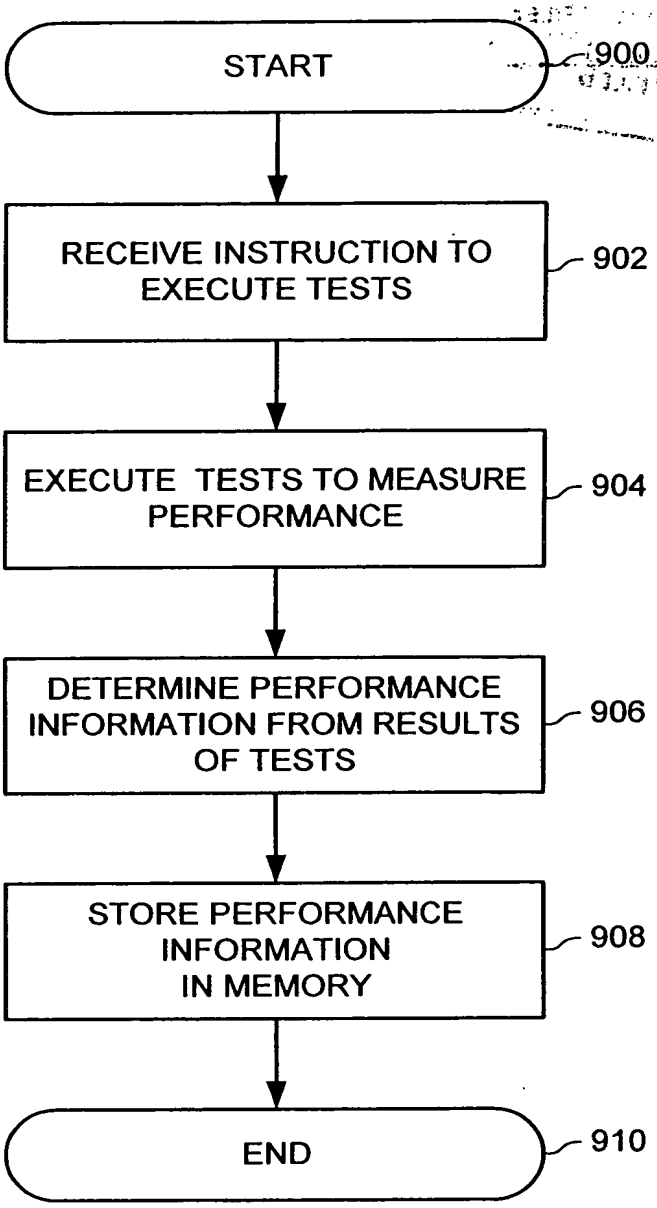
START
900
RECEIVE INSTRUCTION TO EXECUTE TESTS
902
EXECUTE TESTS TO MEASURE PERFORMANCE
904
DETERMINE PERFORMANCE INFORMATION FROM RESULTS OF TESTS
906
STORE PERFORMANCE INFORMATION IN MEMORY
908
END
910

FIG. 9

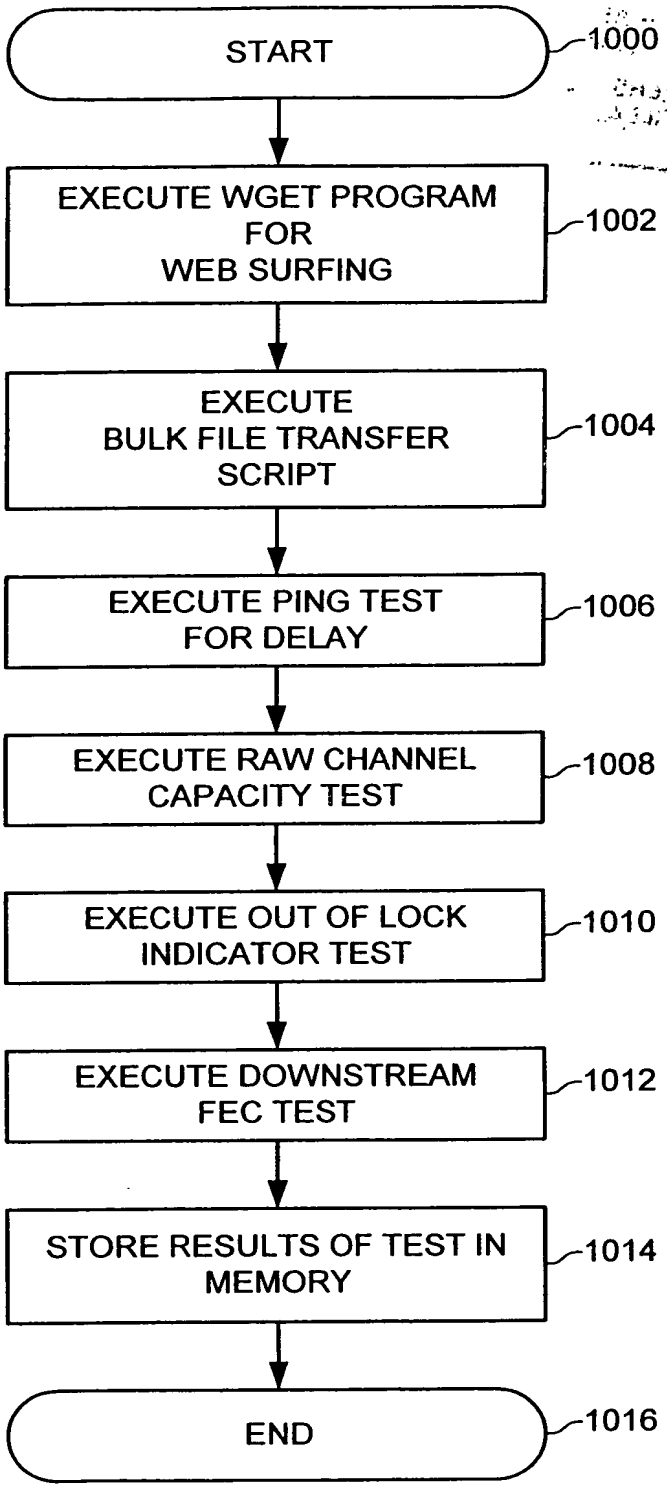
START
1000
EXECUTE WGET PROGRAM FOR WEB SURFING
1002
EXECUTE BULK FILE TRANSFER SCRIPT
1004
EXECUTE PING TEST FOR DELAY
1006
EXECUTE RAW CHANNEL CAPACITY TEST
1008
EXECUTE OUT OF LOCK INDICATOR TEST
1010
EXECUTE DOWNSTREAM FEC TEST
1012
STORE RESULTS OF TEST IN MEMORY
1014
END
1016

FIG. 10

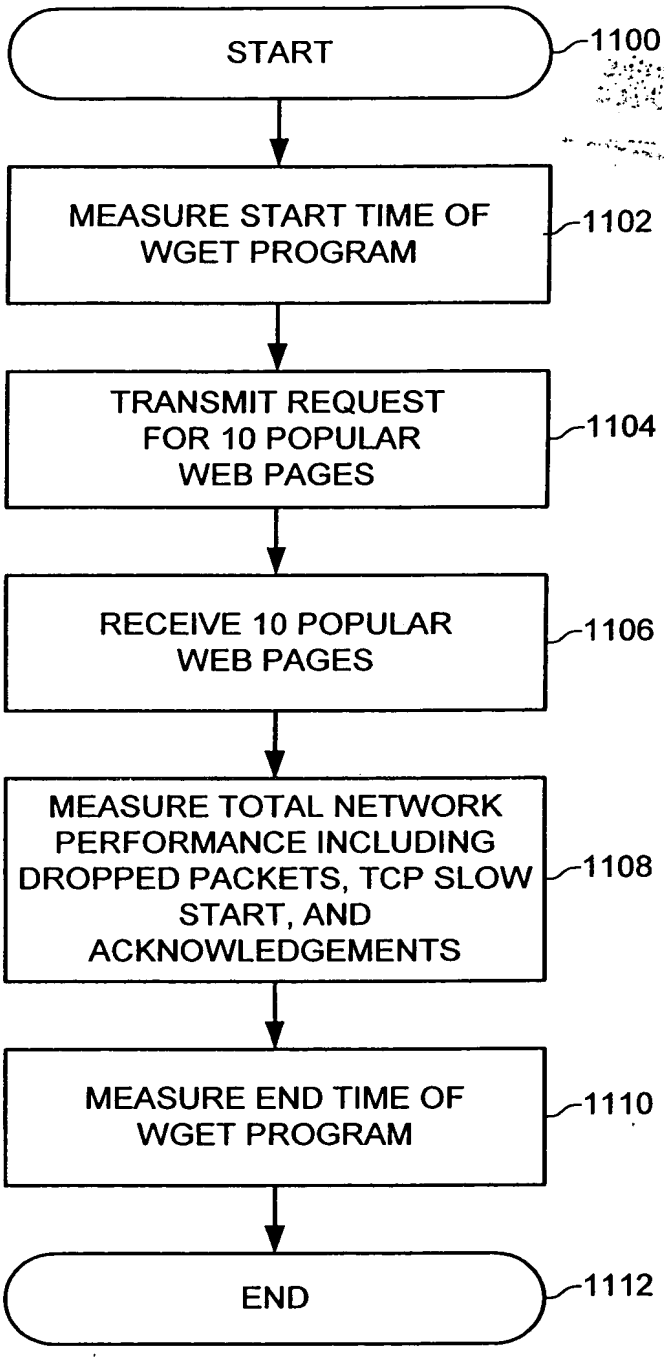
START
1100
MEASURE START TIME OF WGET PROGRAM
1102
TRANSMIT REQUEST FOR 10 POPULAR WEB PAGES
1104
RECEIVE 10 POPULAR WEB PAGES
1106
MEASURE TOTAL NETWORK PERFORMANCE INCLUDING DROPPED PACKETS, TCP SLOW START, AND ACKNOWLEDGEMENTS
1108
MEASURE END TIME OF WGET PROGRAM
1110
END
1112

FIG. 11

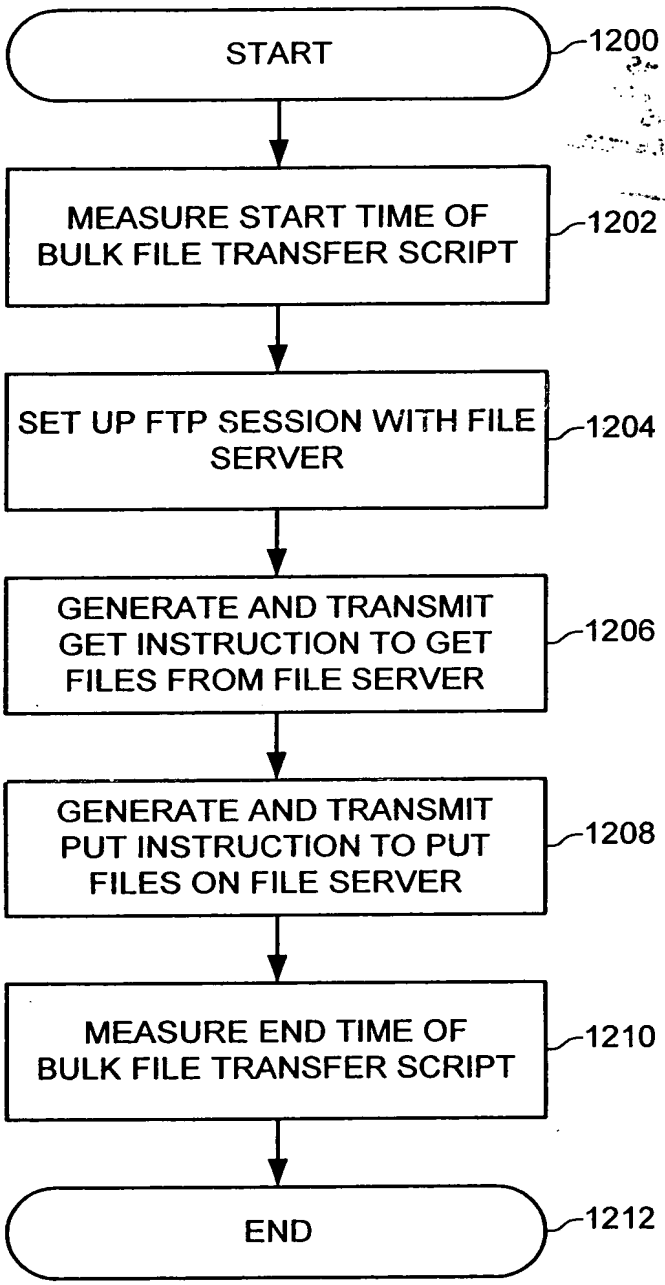
START
1200
MEASURE START TIME OF BULK FILE TRANSFER SCRIPT
1202
SET UP FTP SESSION WITH FILE SERVER
1204
GENERATE AND TRANSMIT GET INSTRUCTION TO GET FILES FROM FILE SERVER
1206
GENERATE AND TRANSMIT PUT INSTRUCTION TO PUT FILES ON FILE SERVER
1208
MEASURE END TIME OF BULK FILE TRANSFER SCRIPT
1210
END
1212

FIG. 12

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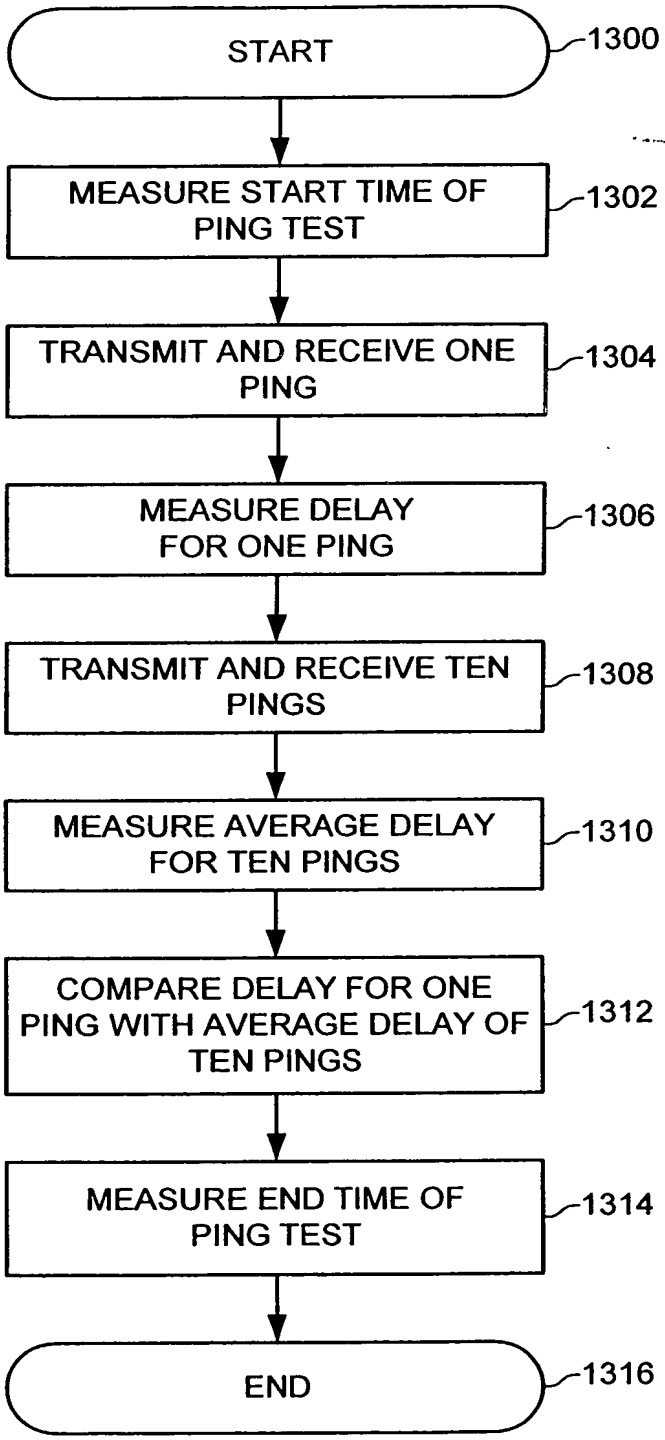

FIG. 13

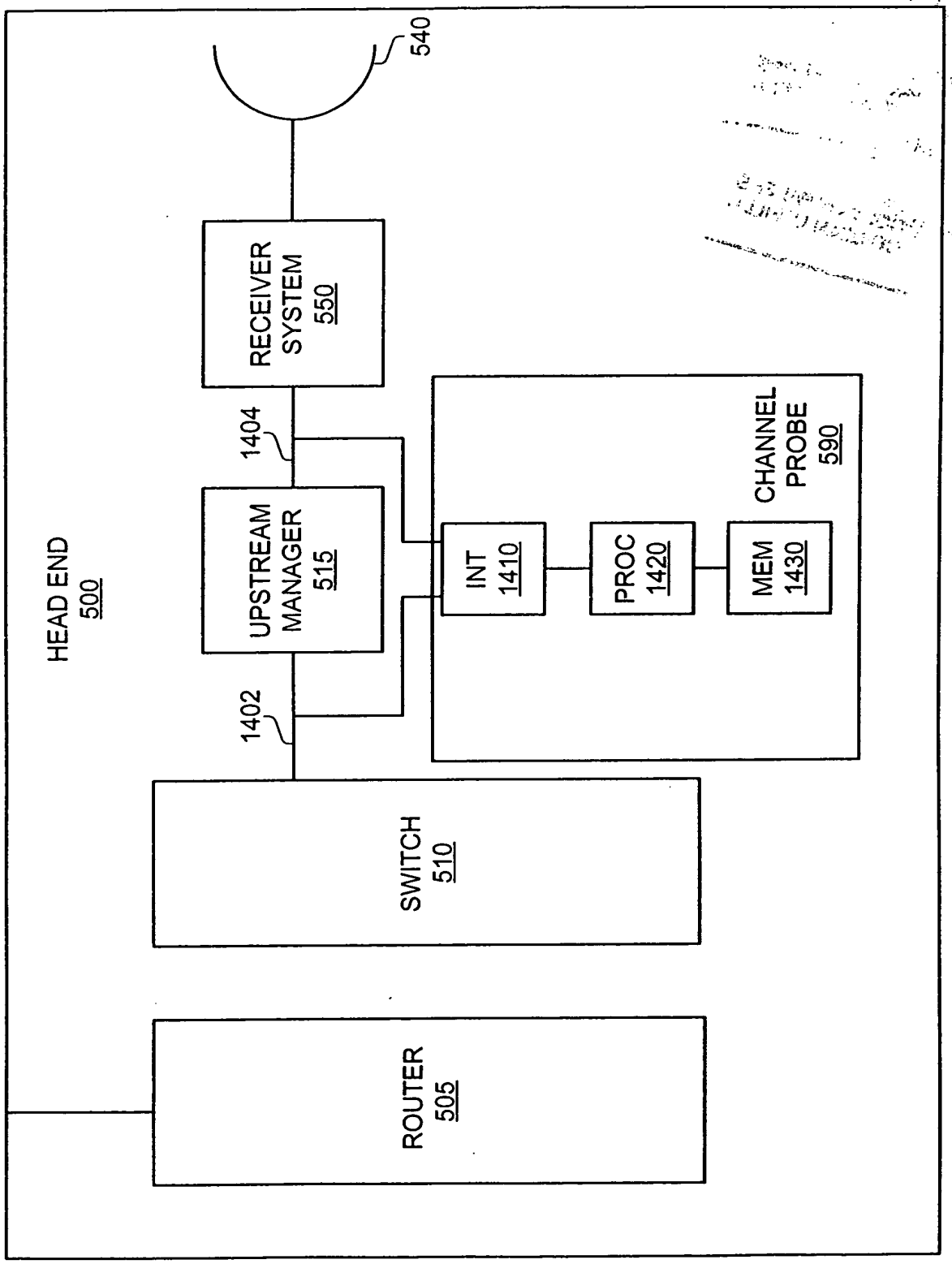
HEAD END
500
540
RECEIVER SYSTEM
550
1404
UPSTREAM MANAGER
515
1402
CHANNEL PROBE
590
INT
1410
PROC
1420
MEM
1430
SWITCH
510
ROUTER
505

FIG. 14

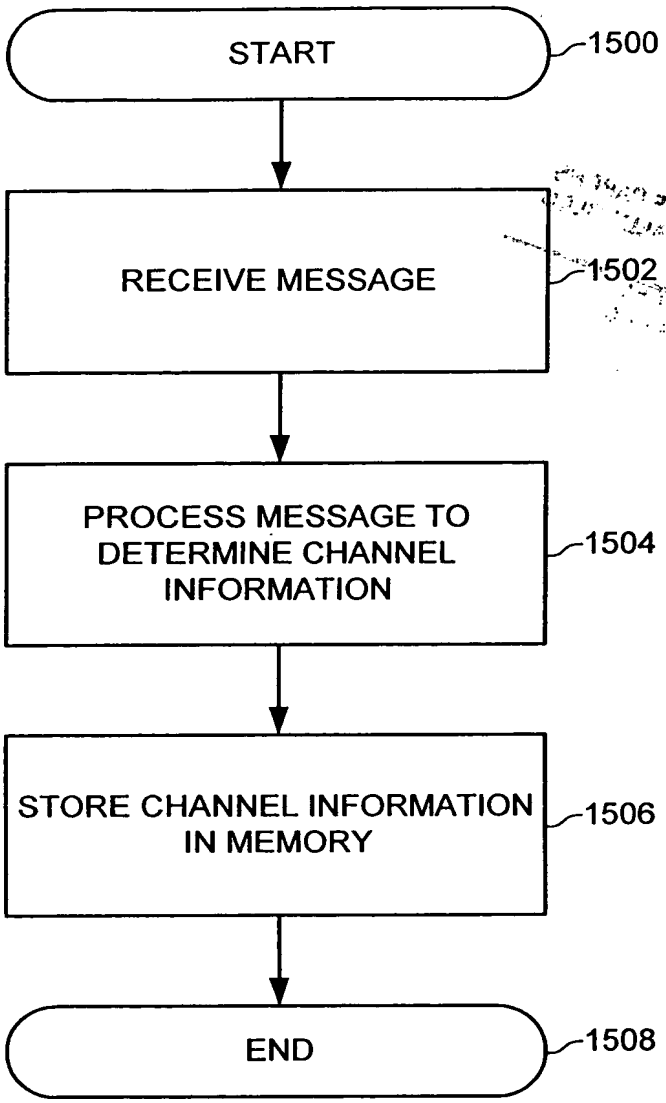

FIG. 15

20050705.150849.0

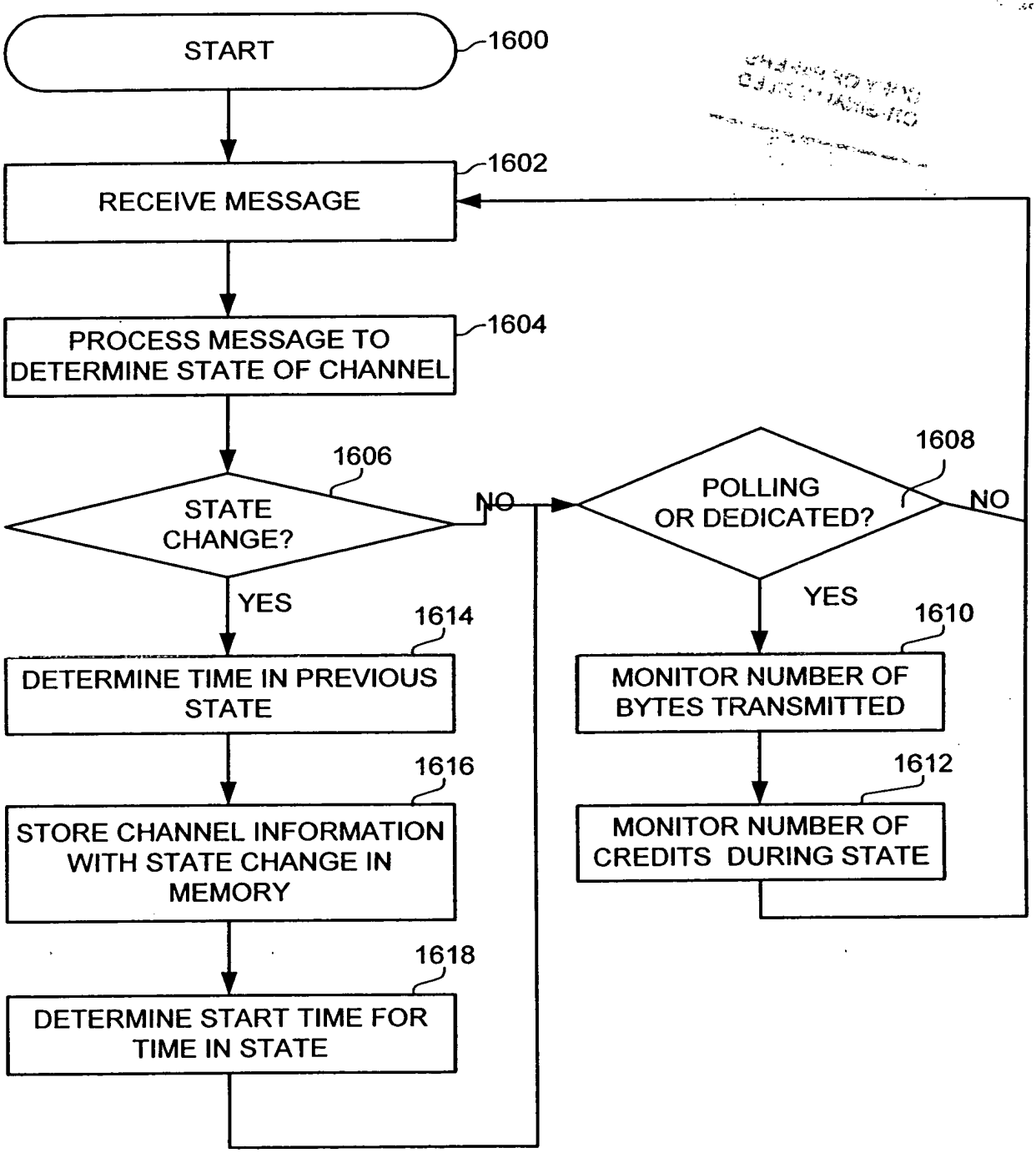
START
1600
RECEIVE MESSAGE
1602
PROCESS MESSAGE TO DETERMINE STATE OF CHANNEL
1604
STATE CHANGE?
1606
NO
YES
POLLING OR DEDICATED?
1608
NO
YES
DETERMINE TIME IN PREVIOUS STATE
1614
STORE CHANNEL INFORMATION WITH STATE CHANGE IN MEMORY
1616
DETERMINE START TIME FOR TIME IN STATE
1618
MONITOR NUMBER OF BYTES TRANSMITTED
1610
MONITOR NUMBER OF CREDITS DURING STATE
1612

FIG. 16

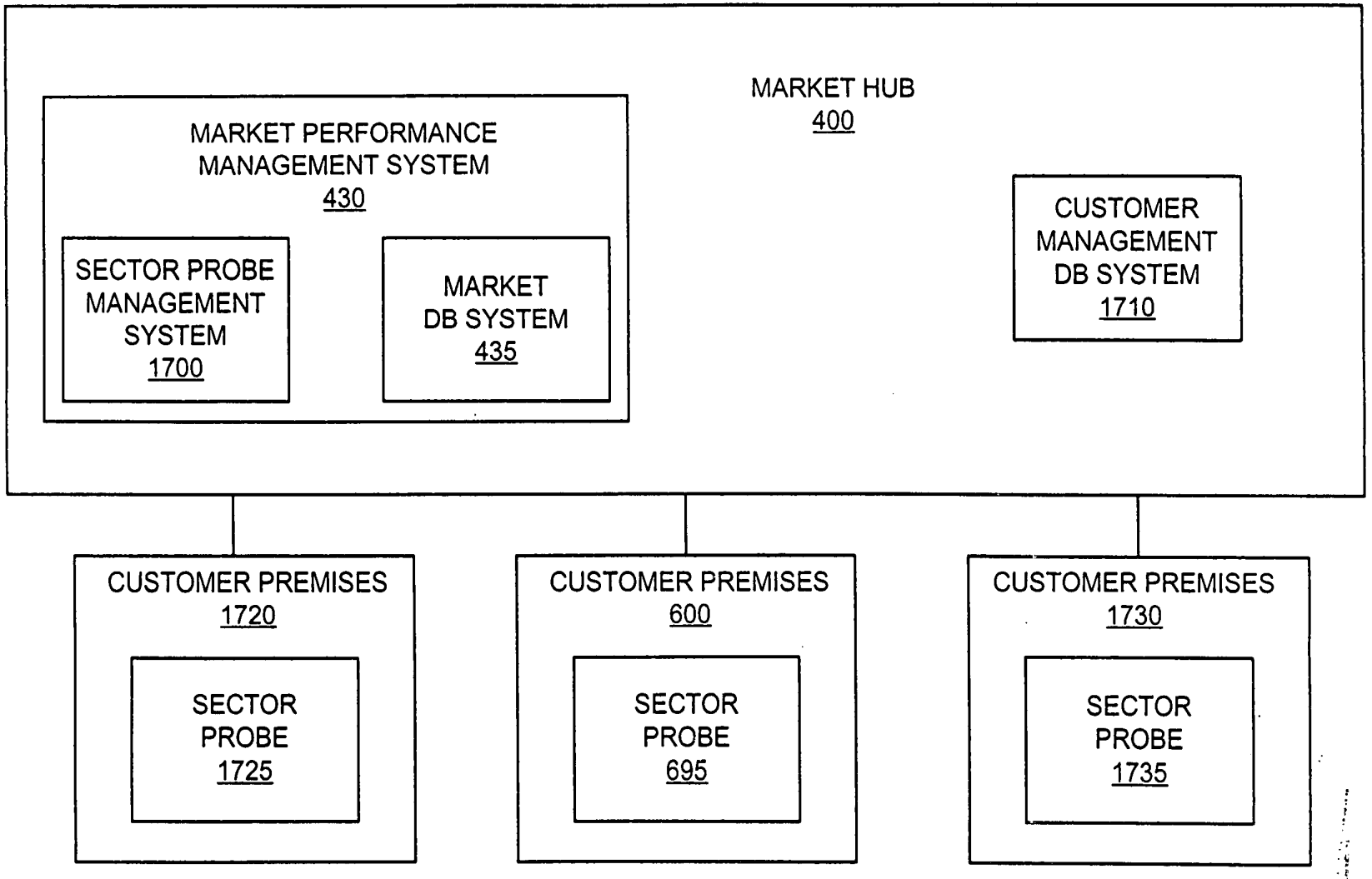

FIG. 17

Title: PROBE DEVICE FOR DETERMINING CHANNEL INFORMATION IN A BR[illegible] AND WIRELESS SYSTEM
Inventor[illegible] Dispensa
Serial No. [illegible] Docket No.: 09/981,01[illegible]

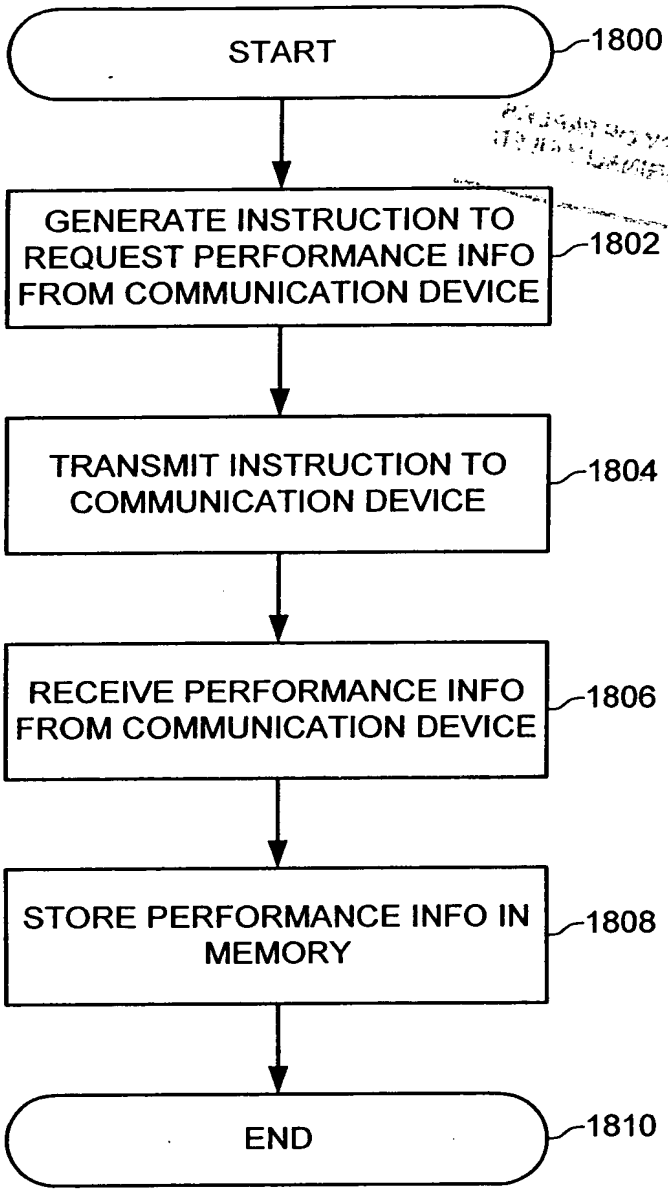
START
1800
GENERATE INSTRUCTION TO REQUEST PERFORMANCE INFO FROM COMMUNICATION DEVICE
1802
TRANSMIT INSTRUCTION TO COMMUNICATION DEVICE
1804
RECEIVE PERFORMANCE INFO FROM COMMUNICATION DEVICE
1806
STORE PERFORMANCE INFO IN MEMORY
1808
END
1810

FIG. 18

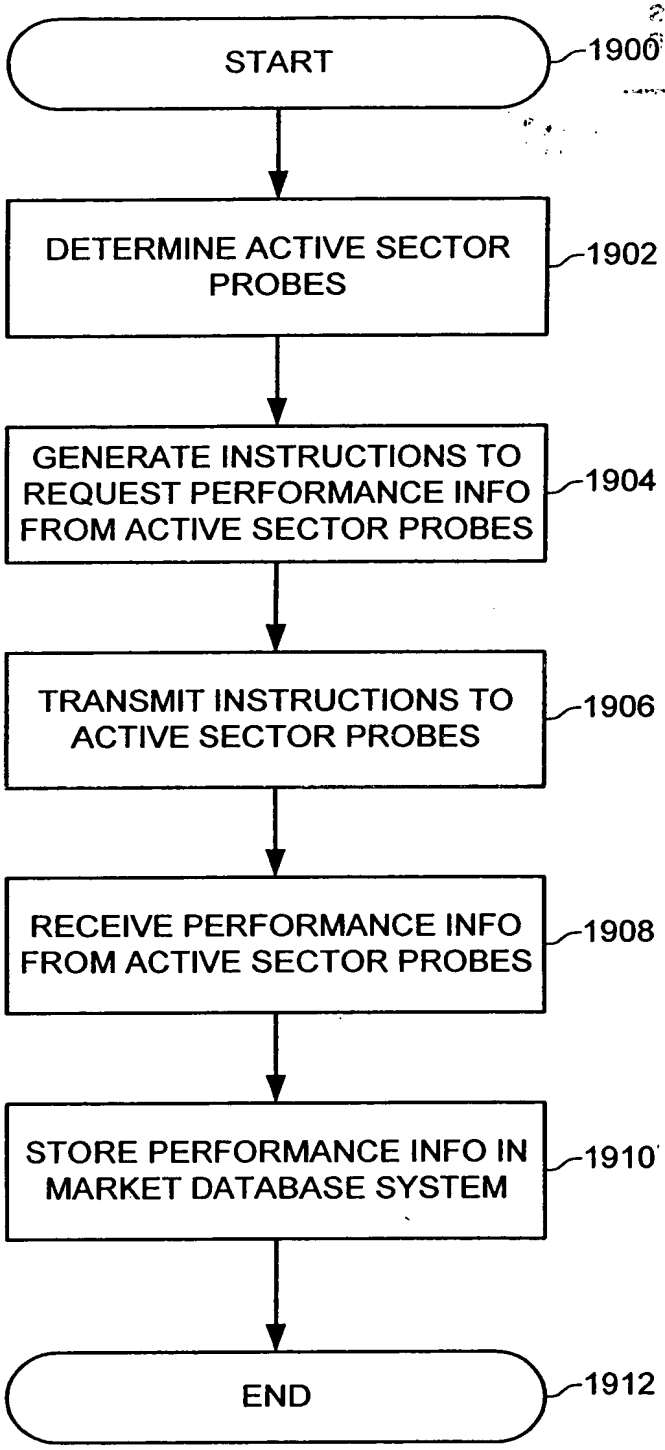
START
1900
DETERMINE ACTIVE SECTOR PROBES
1902
GENERATE INSTRUCTIONS TO REQUEST PERFORMANCE INFO FROM ACTIVE SECTOR PROBES
1904
TRANSMIT INSTRUCTIONS TO ACTIVE SECTOR PROBES
1906
RECEIVE PERFORMANCE INFO FROM ACTIVE SECTOR PROBES
1908
STORE PERFORMANCE INFO IN MARKET DATABASE SYSTEM
1910
END
1912

FIG. 19

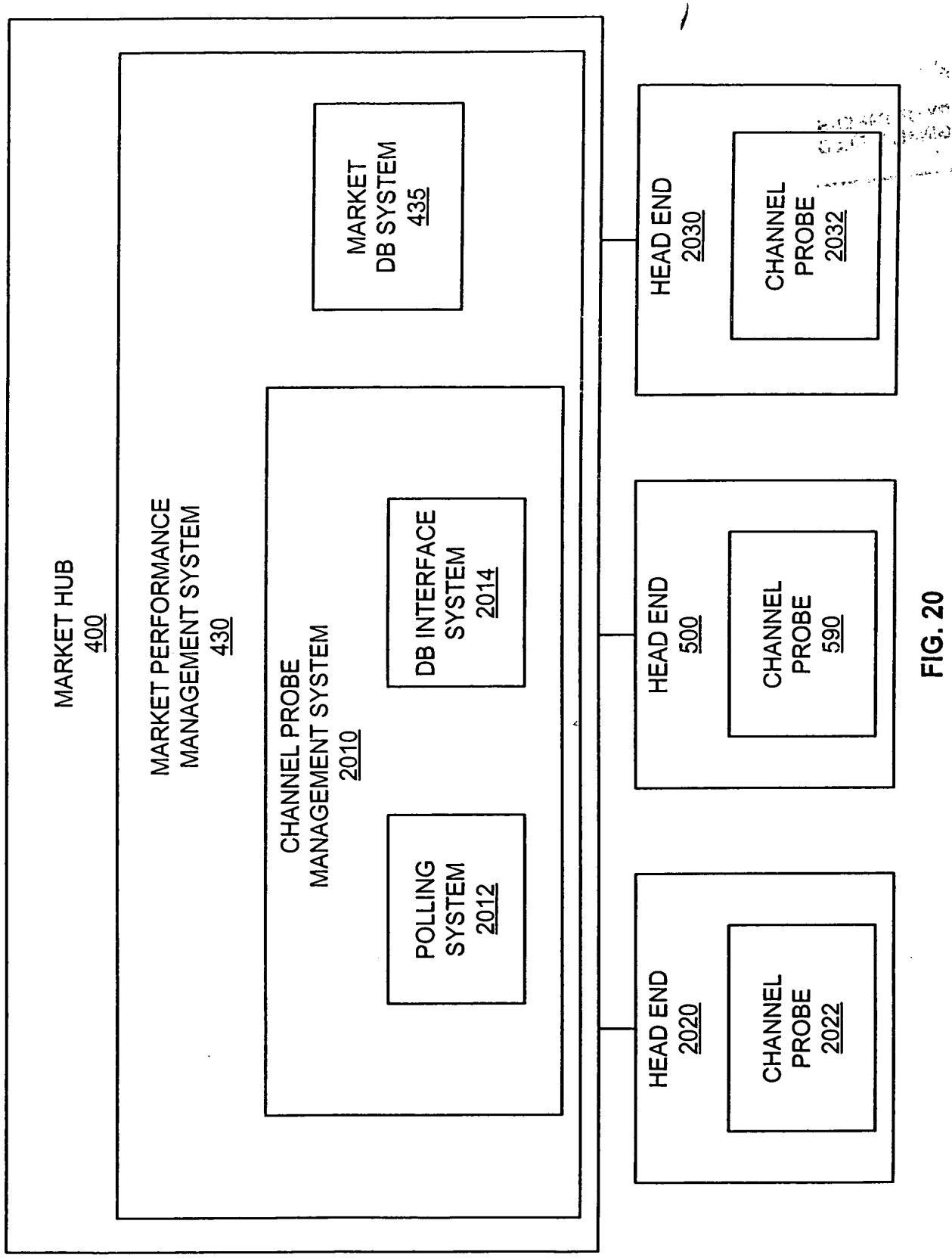
MARKET HUB
400
MARKET PERFORMANCE MANAGEMENT SYSTEM
430
MARKET DB SYSTEM
435
CHANNEL PROBE MANAGEMENT SYSTEM
2010
DB INTERFACE SYSTEM
2014
POLLING SYSTEM
2012
HEAD END
2030
CHANNEL PROBE
2032
HEAD END
500
CHANNEL PROBE
590
HEAD END
2020
CHANNEL PROBE
2022

FIG. 20

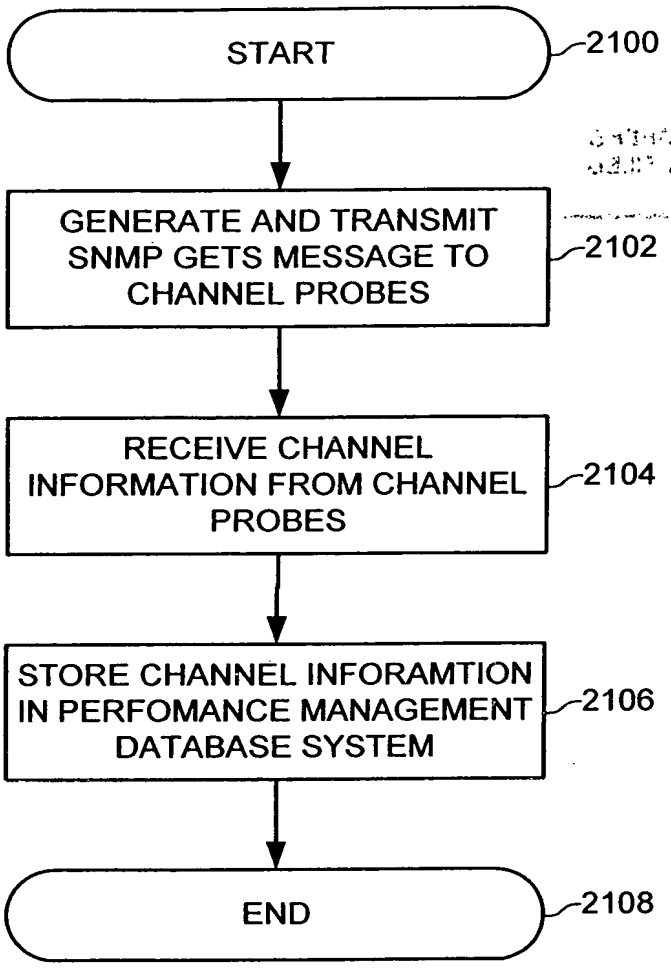
START
2100
GENERATE AND TRANSMIT SNMP GETS MESSAGE TO CHANNEL PROBES
2102
RECEIVE CHANNEL INFORMATION FROM CHANNEL PROBES
2104
STORE CHANNEL INFORAMTION IN PERFOMANCE MANAGEMENT DATABASE SYSTEM
2106
END
2108

FIG. 21

FIG. 22
PRIOR ART

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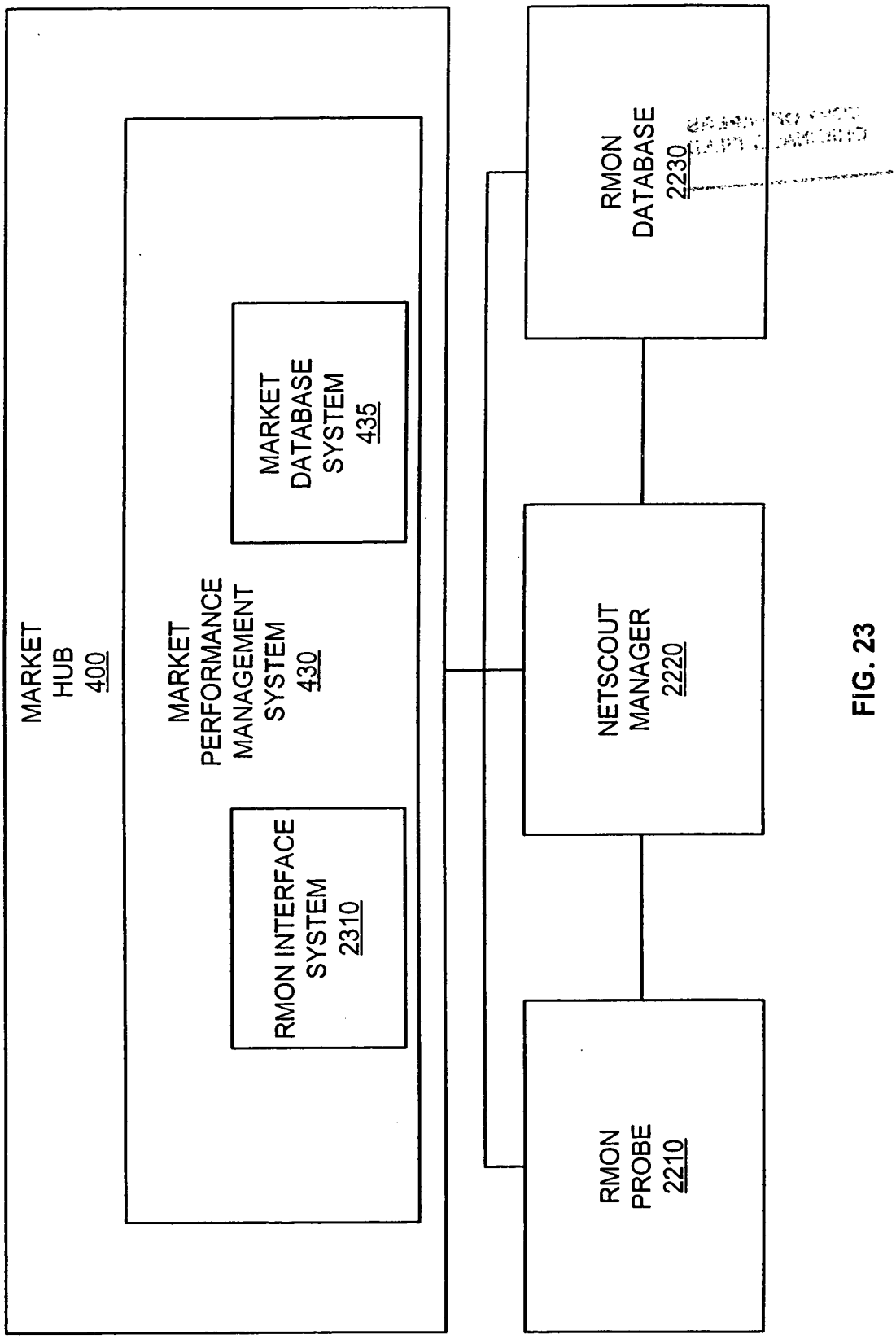

MARKET HUB 400
MARKET PERFORMANCE MANAGEMENT SYSTEM 430
MARKET DATABASE SYSTEM 435
RMON INTERFACE SYSTEM 2310
RMON DATABASE 2230
NETSCOUT MANAGER 2220
RMON PROBE 2210

FIG. 23

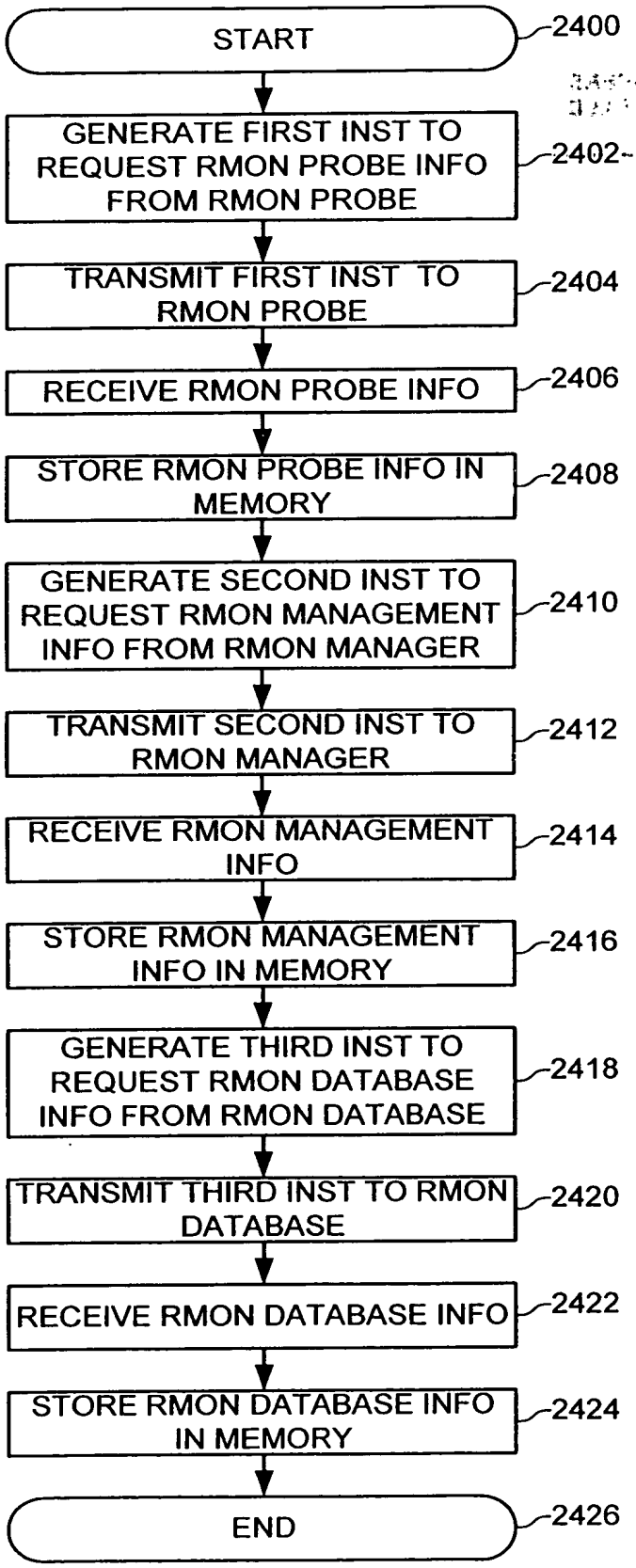

START
2400
GENERATE FIRST INST TO REQUEST RMON PROBE INFO FROM RMON PROBE
2402
TRANSMIT FIRST INST TO RMON PROBE
2404
RECEIVE RMON PROBE INFO
2406
STORE RMON PROBE INFO IN MEMORY
2408
GENERATE SECOND INST TO REQUEST RMON MANAGEMENT INFO FROM RMON MANAGER
2410
TRANSMIT SECOND INST TO RMON MANAGER
2412
RECEIVE RMON MANAGEMENT INFO
2414
STORE RMON MANAGEMENT INFO IN MEMORY
2416
GENERATE THIRD INST TO REQUEST RMON DATABASE INFO FROM RMON DATABASE
2418
TRANSMIT THIRD INST TO RMON DATABASE
2420
RECEIVE RMON DATABASE INFO
2422
STORE RMON DATABASE INFO IN MEMORY
2424
END
2426

FIG. 24

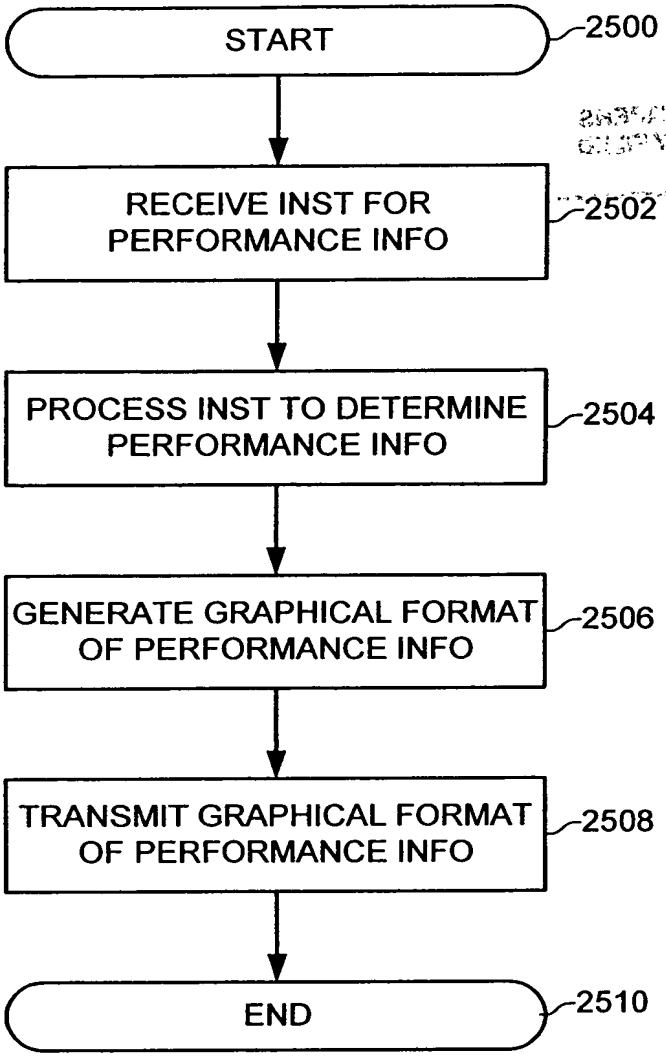

START
2500
RECEIVE INST FOR PERFORMANCE INFO
2502
PROCESS INST TO DETERMINE PERFORMANCE INFO
2504
GENERATE GRAPHICAL FORMAT OF PERFORMANCE INFO
2506
TRANSMIT GRAPHICAL FORMAT OF PERFORMANCE INFO
2508
END
2510

FIG. 25

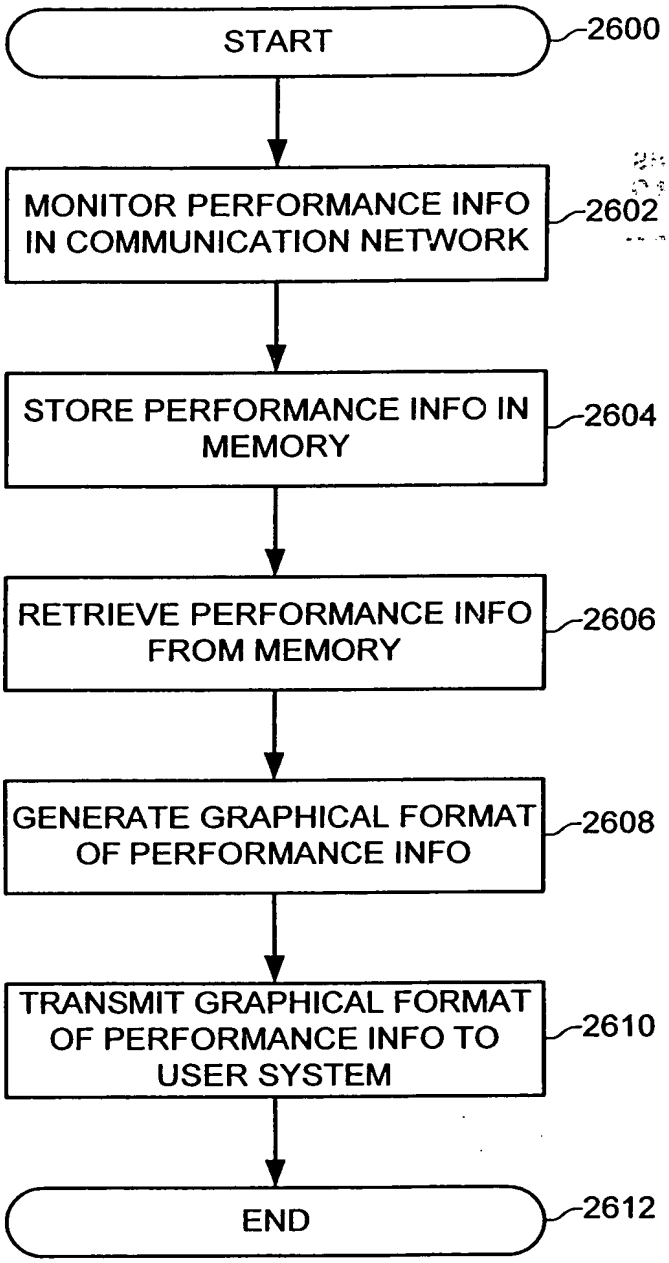

START
2600
MONITOR PERFORMANCE INFO IN COMMUNICATION NETWORK
2602
STORE PERFORMANCE INFO IN MEMORY
2604
RETRIEVE PERFORMANCE INFO FROM MEMORY
2606
GENERATE GRAPHICAL FORMAT OF PERFORMANCE INFO
2608
TRANSMIT GRAPHICAL FORMAT OF PERFORMANCE INFO TO USER SYSTEM
2610
END
2612

FIG. 26

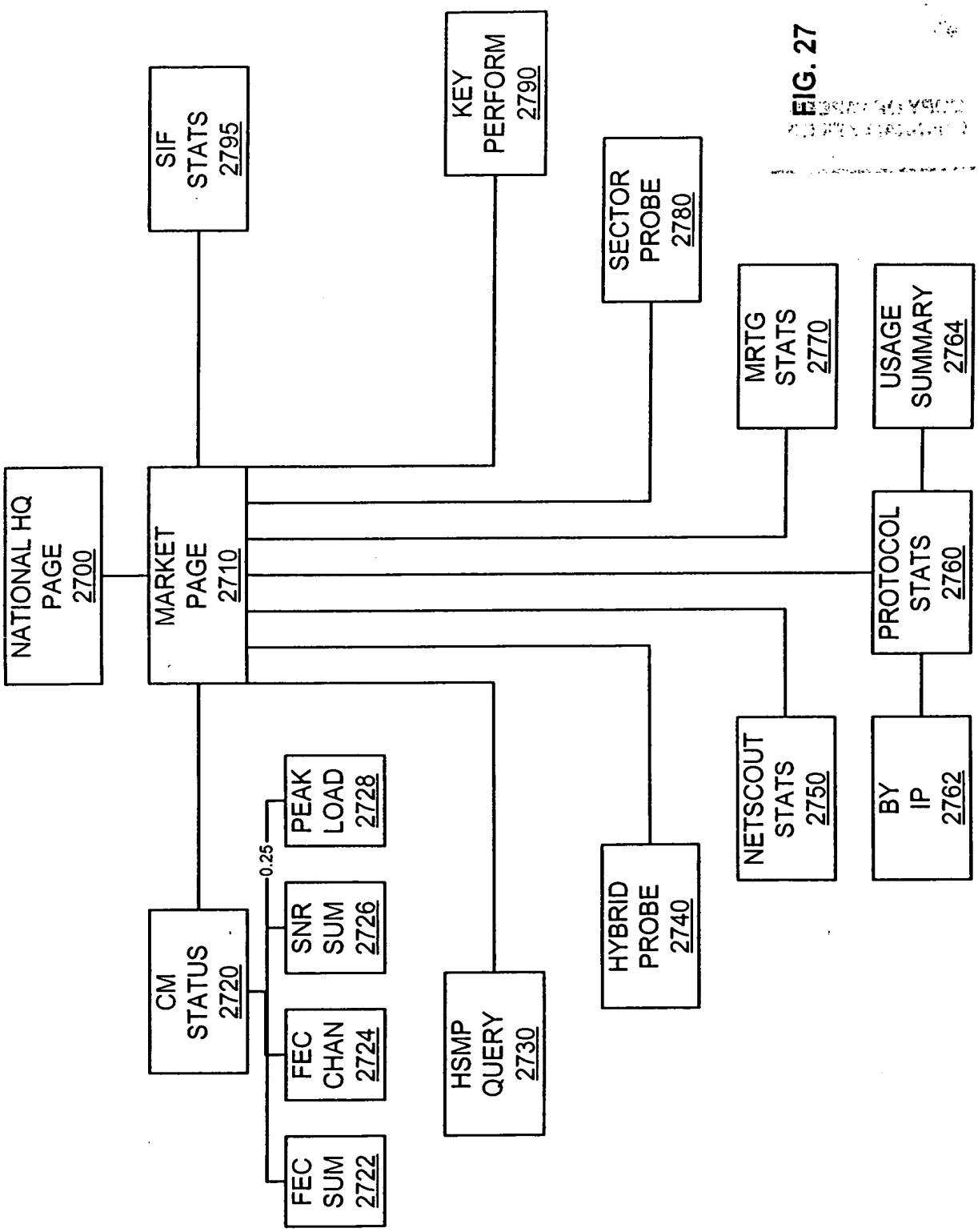

NATIONAL HQ PAGE 2700
MARKET PAGE 2710
SIF STATS 2795
KEY PERFORM 2790
SECTOR PROBE 2780
MRTG STATS 2770
USAGE SUMMARY 2764
PROTOCOL STATS 2760
BY IP 2762
NETSCOUT STATS 2750
HYBRID PROBE 2740
HSMP QUERY 2730
CM STATUS 2720
0.25
PEAK LOAD 2728
SNR SUM 2726
FEC CHAN 2724
FEC SUM 2722

FIG. 27

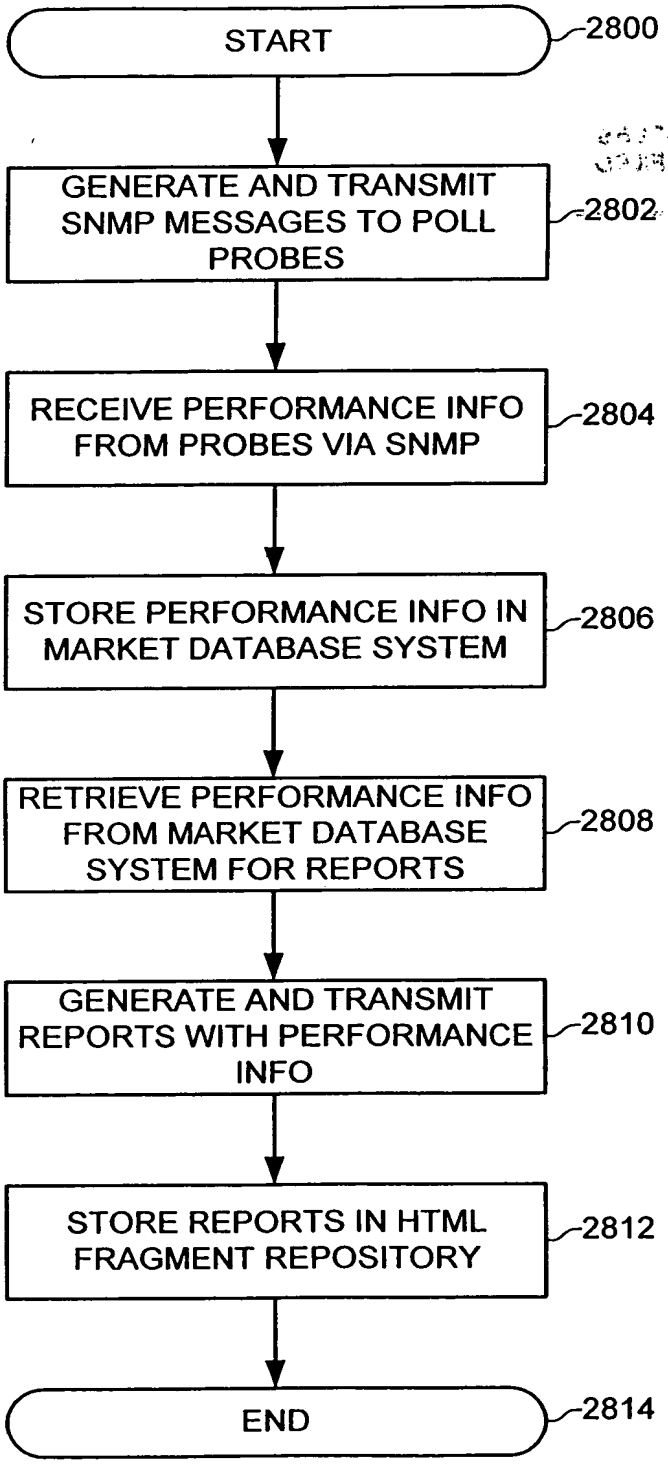

START
2800
GENERATE AND TRANSMIT SNMP MESSAGES TO POLL PROBES
2802
RECEIVE PERFORMANCE INFO FROM PROBES VIA SNMP
2804
STORE PERFORMANCE INFO IN MARKET DATABASE SYSTEM
2806
RETRIEVE PERFORMANCE INFO FROM MARKET DATABASE SYSTEM FOR REPORTS
2808
GENERATE AND TRANSMIT REPORTS WITH PERFORMANCE INFO
2810
STORE REPORTS IN HTML FRAGMENT REPOSITORY
2812
END
2814

FIG. 28

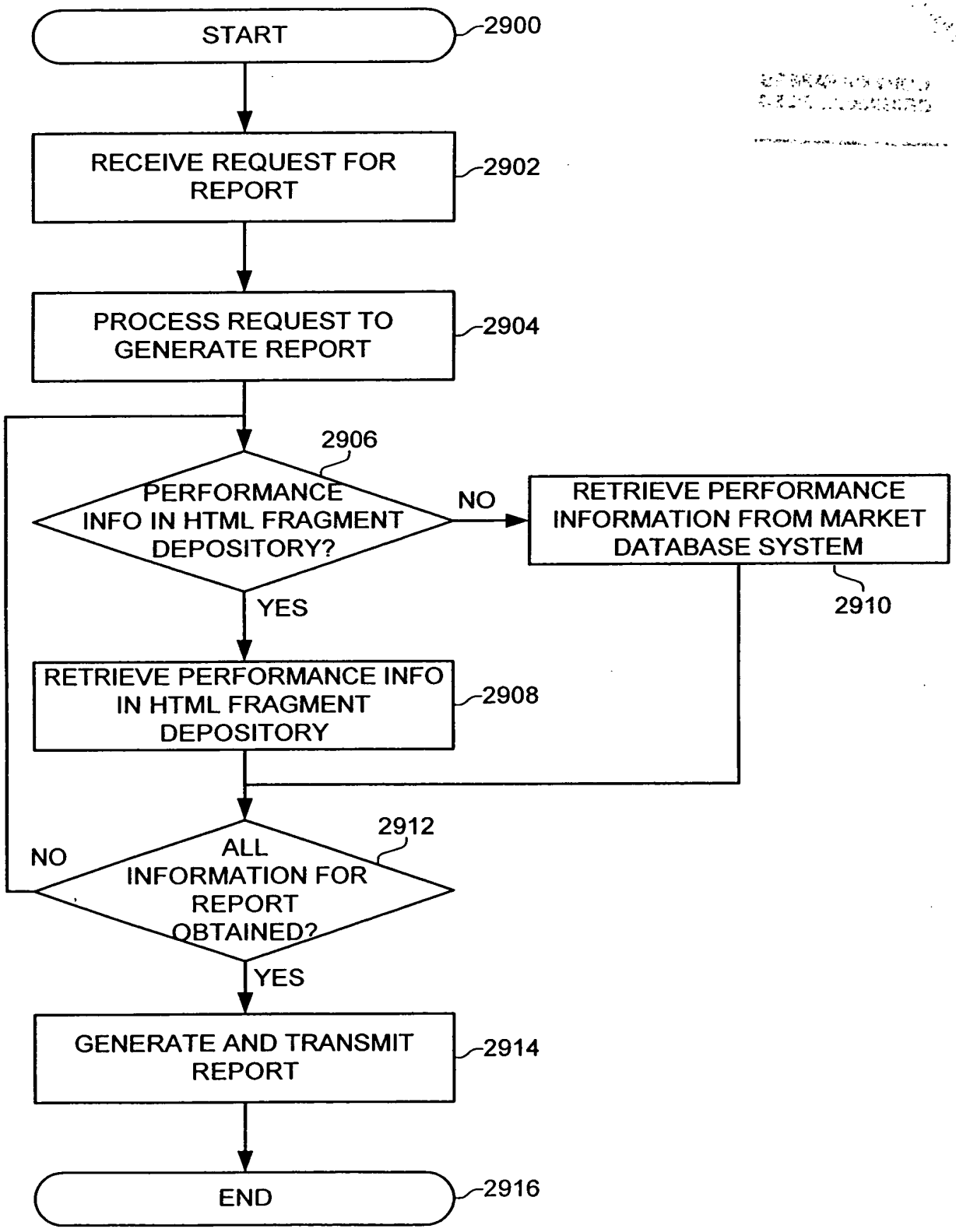

START
2900
RECEIVE REQUEST FOR REPORT
2902
PROCESS REQUEST TO GENERATE REPORT
2904
2906
PERFORMANCE INFO IN HTML FRAGMENT DEPOSITORY?
NO
RETRIEVE PERFORMANCE INFORMATION FROM MARKET DATABASE SYSTEM
2910
YES
RETRIEVE PERFORMANCE INFO IN HTML FRAGMENT DEPOSITORY
2908
2912
NO
ALL INFORMATION FOR REPORT OBTAINED?
YES
GENERATE AND TRANSMIT REPORT
2914
END
2916

FIG. 29

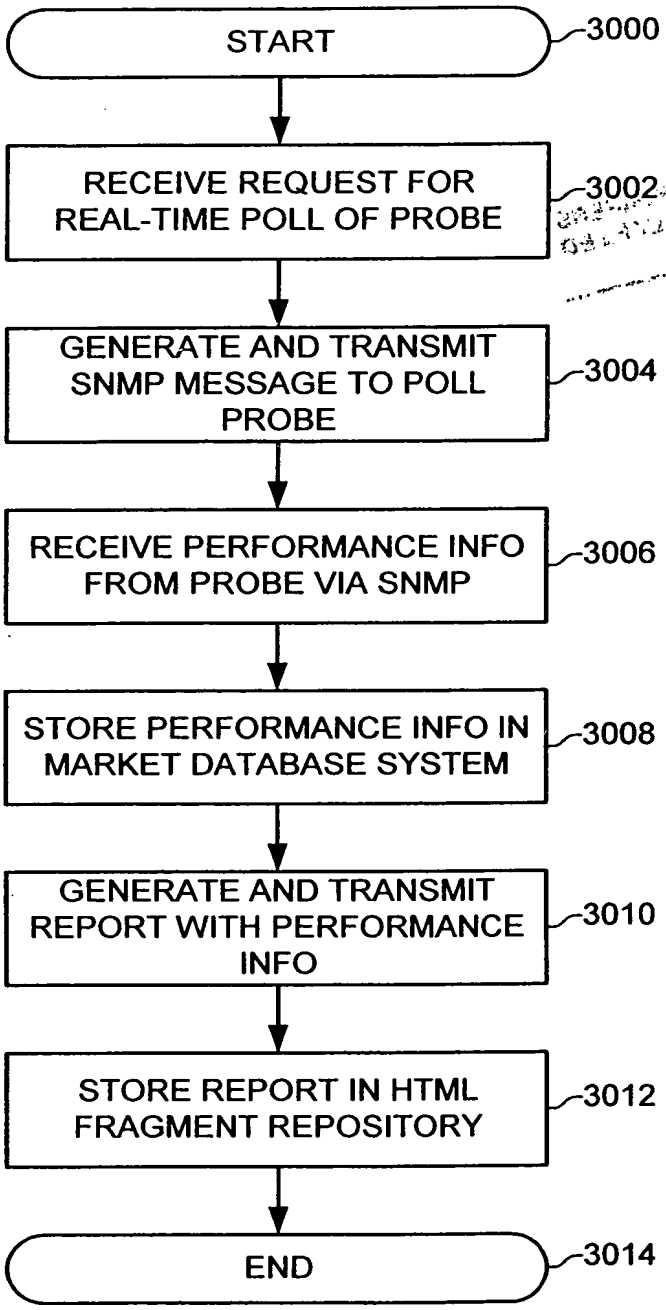


FIG. 30

20071205150756

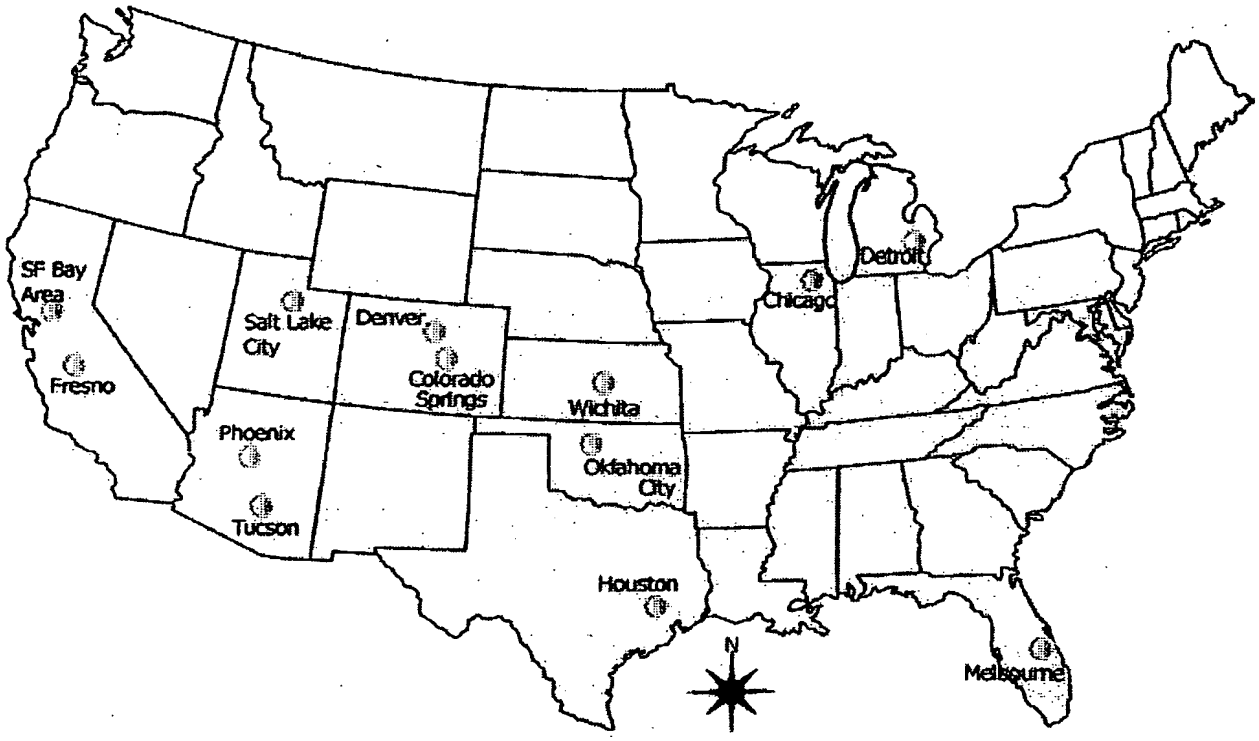

SF Bay Area
Fresno
Salt Lake City
Denver
Colorado Springs
Phoenix
Tucson
Wichita
Oklahoma City
Houston
Chicago
Detroit
Melbourne
N

FIG. 31

WELCOME TO VERTEX! To navigate this site, links are located in the gray box below the thick red line. Inside the thick red line you will find a selection of categories to choose from. Click on one of these categories to display it's related links, then click on the link you want and you are there. One special note. The 'Markets' links will take you to the same report you are currently at, in the market you choose.

Questions?: Click on the button named 'HELP' in the upper right-hand corner.

Visibility into the network is a primary concern of the Vertex team. It is the job of the network management architecture to enable this visibility. Without it, the network cannot be effectively run: faults cannot be located and corrected, capacity planning cannot be done, and progressive problems cannot be found and stopped from reaching a critical stage until it is too late.

The architecture is divided up into three parts: collectors (also known as 'probes'), data warehouses, and reporting tools. Collectors include devices such as the NetScout RMON probe and two in-house engineered probes, the Hybrid Probe and the Sector Probe. Data warehouses consist of Oracle databases residing on Market and National Vertex Servers. These databases run on Sun Microsystems UNIX workstations that have RAID mass storage systems built in. The reporting tools are primarily the web-based tools hosted by the Market VERTEX Servers.

FIG. 32

Title: PROBE DEVICE FOR DETERMINING CHANNEL INFORMATION IN A BROADBAND WIRELESS SYSTEM
Inventor(s): S[redacted]penza
Serial No. or Docket No.: 09/981,015

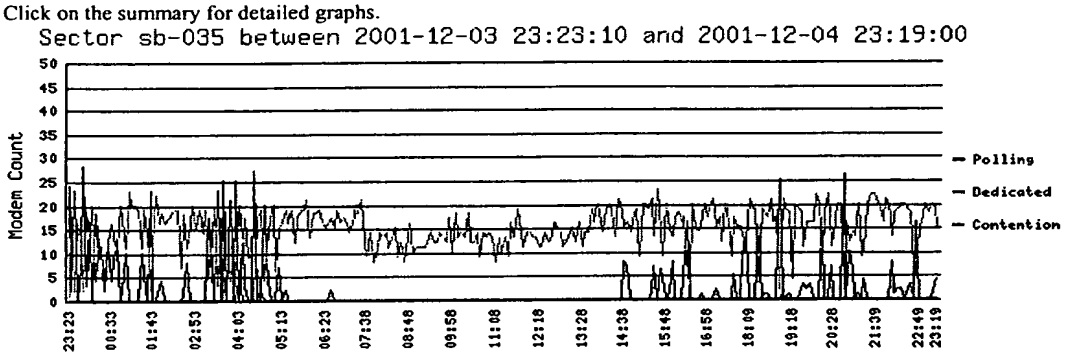
User/Channel Distribution by Sector

Load and Capacity for All Sectors.

Enter Query Date in YYYYMMDD format: 20011204 Submit

Sector sb-035

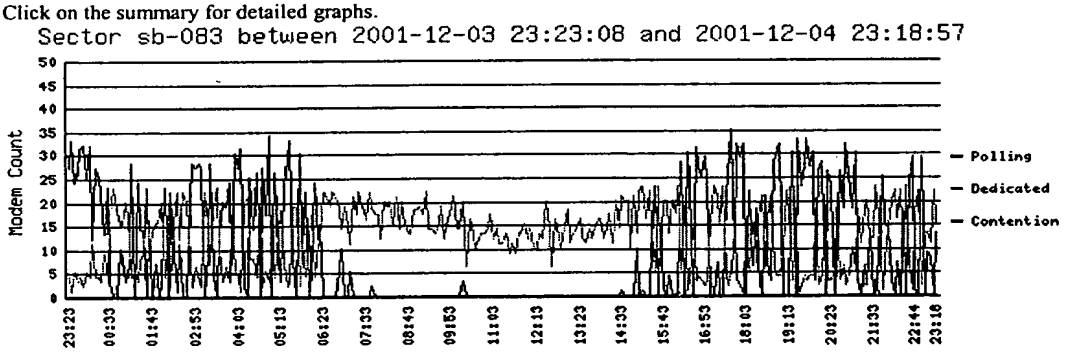
Click on the summary for detailed graphs.



[FEC Summary] [FEC Channel] [SNR Summary] [Peak Load/Capacity: 52 %]

Sector sb-083

Click on the summary for detailed graphs.



[FEC Summary] [FEC Channel] [SNR Summary] [Peak Load/Capacity: 56 %]

Sector sb203-32

Click on the summary for detailed graphs.

FIG. 33

FEC Summary Graph for sb-035

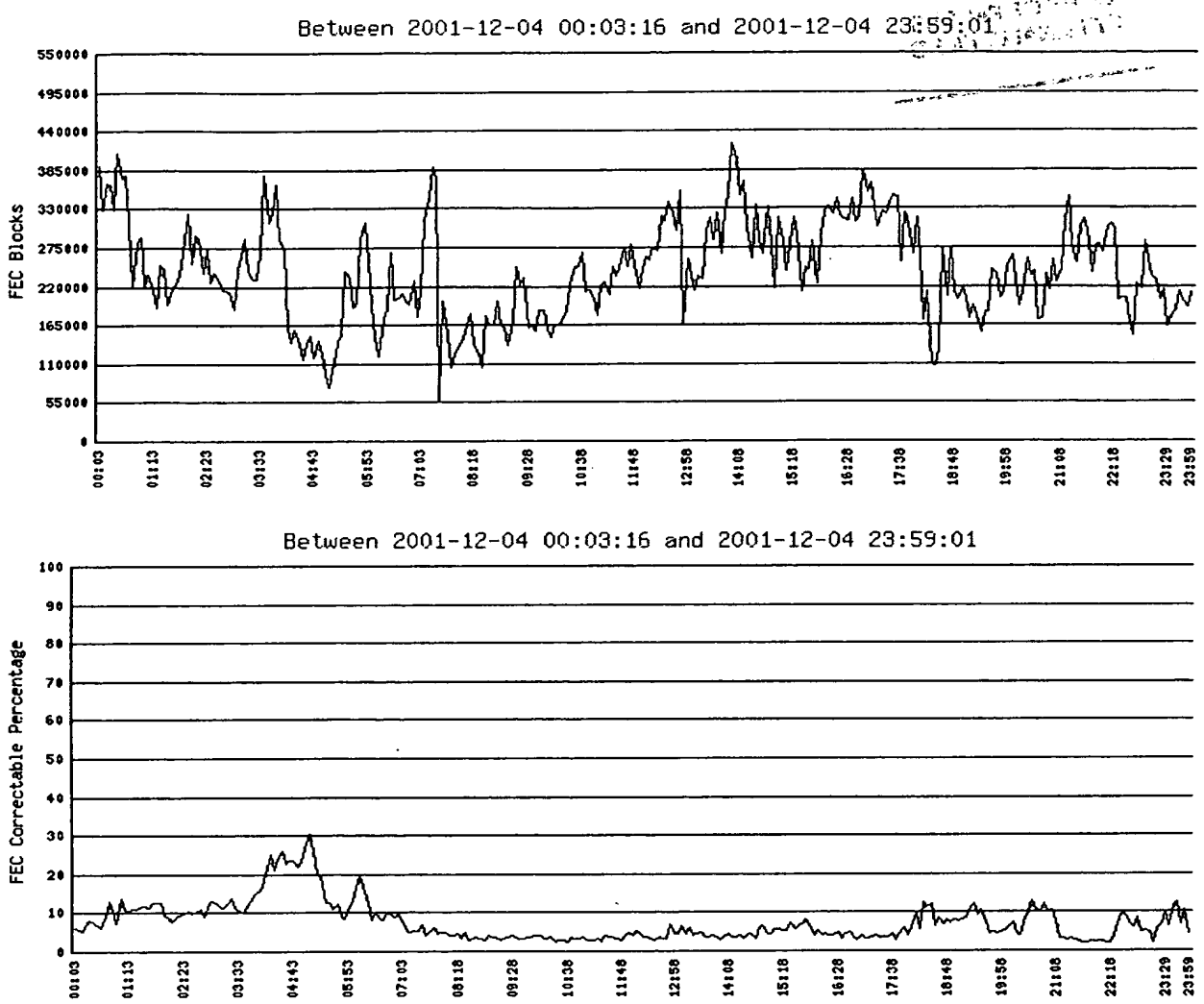


EXHIBIT 1035

FIG. 34

Channel detail graph for sb203-32 channel 2

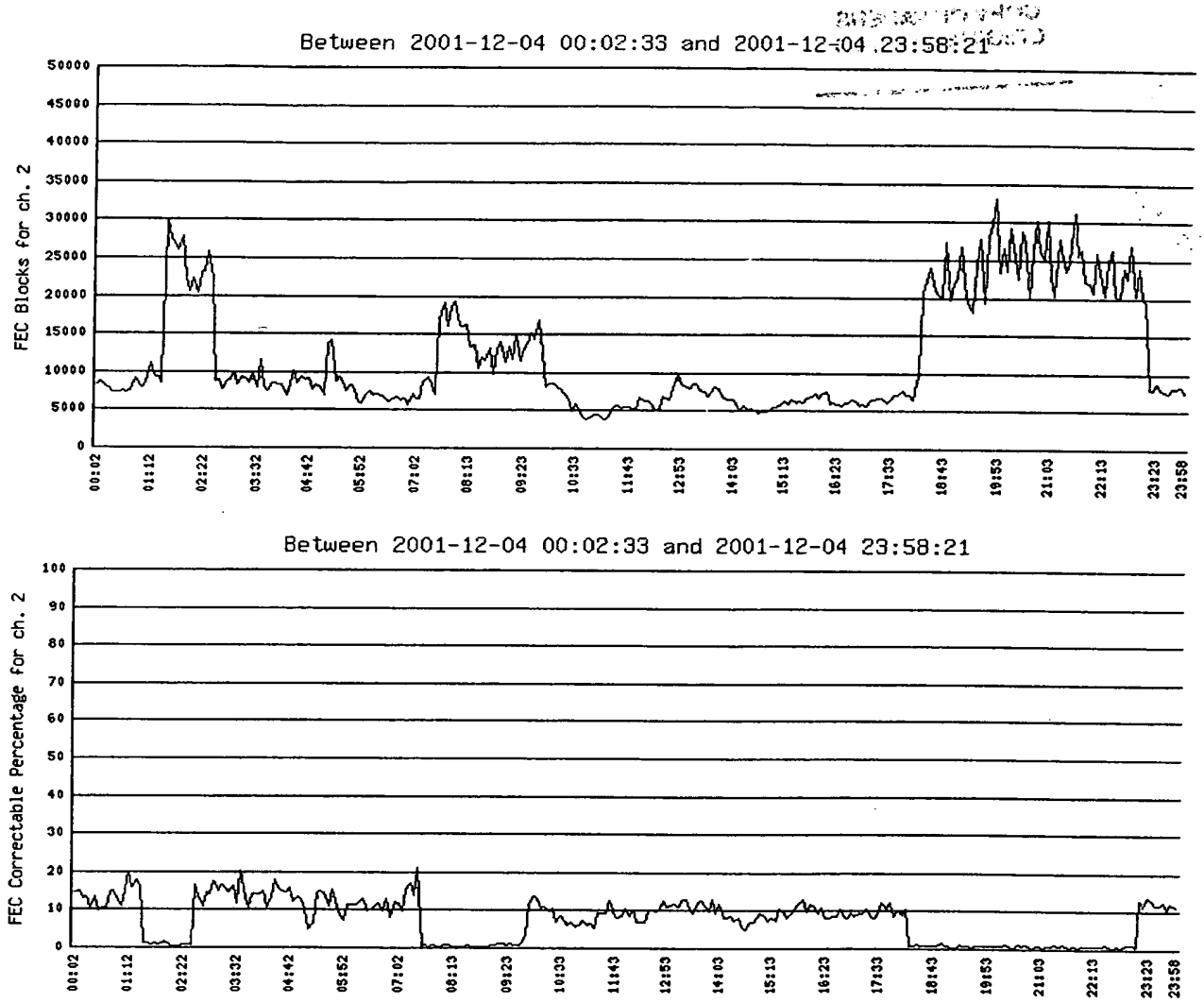


FIG. 35

EXHIBIT 1005 PAGE 30 OF 50

Signal to Noise graph for sb203-32

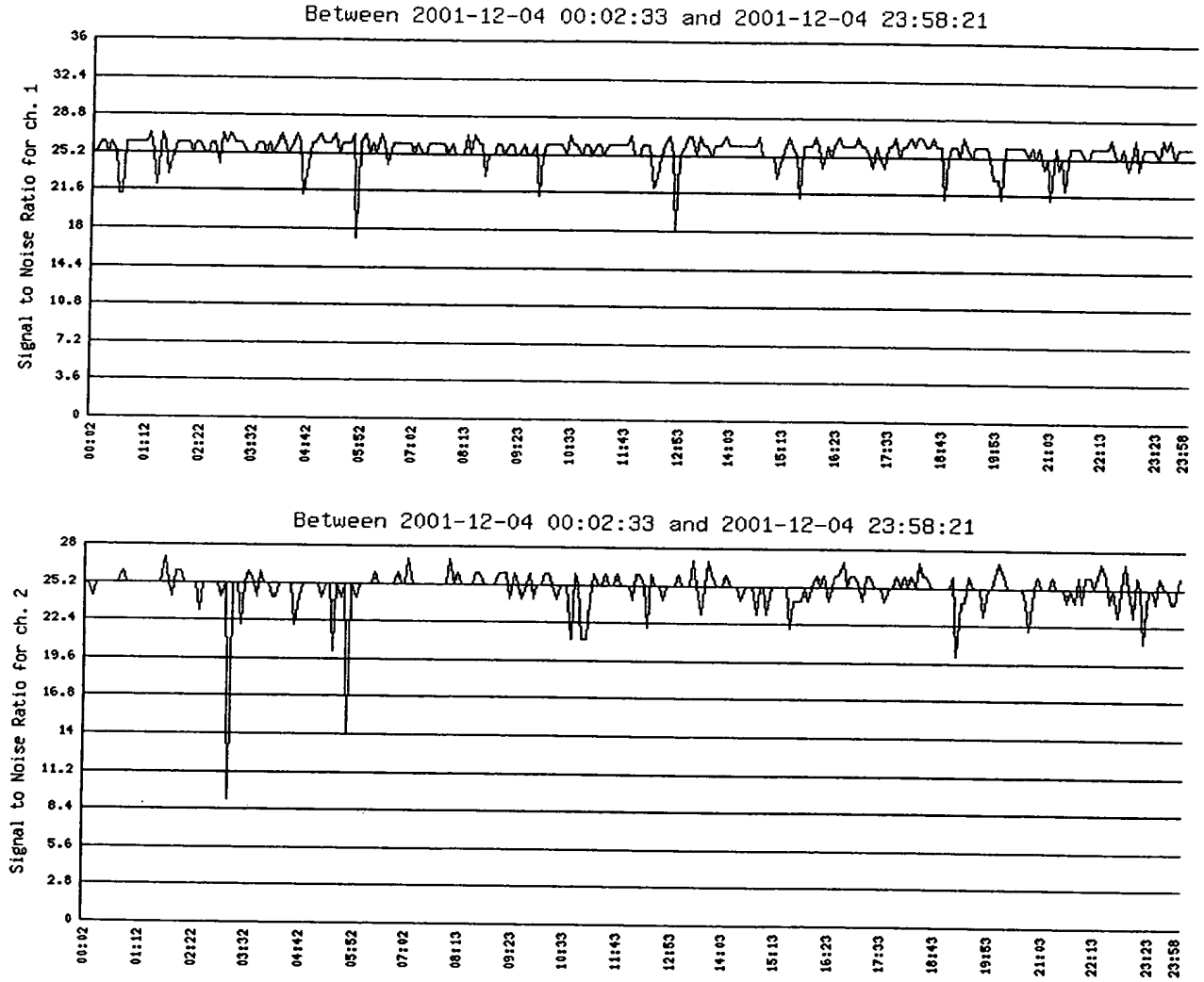


FIG. 36

20970 "STOT8660

Load and Capacity

Load: If the number of dedicated channels exceeds 50% of the total number of channels, Load = (poll + ded + con) * 1.1 else Load = [(ded * 8)+(poll)] * [1 + Con/(poll+ded)]. ded: Number of dedicated modems, poll: Number of polling modems, and con: Number of contention modems.
Capacity: (Number of channels - 1) * 8.

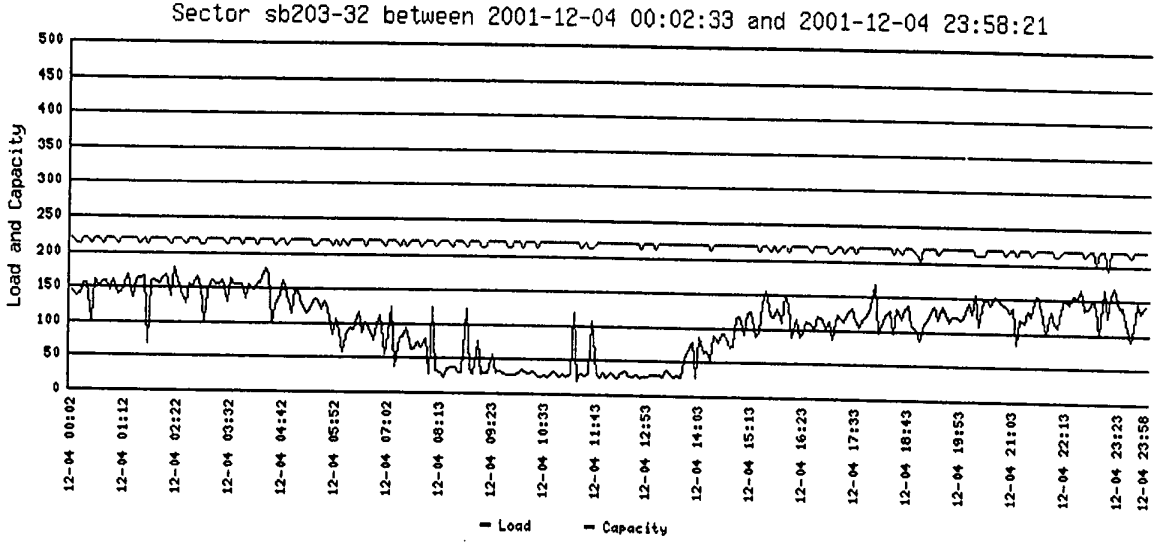


FIG. 37

Title: PROBE DEVICE FOR DETERMINING CHANNEL INFORMATION IN A BROA[redacted]D WIRELESS SYSTEM
Inventor(s): Dispensa
Serial No. or Docket No.: 09/981,015

20070508

HSMP Gateway

Access Level	BWG Engineer
IP Address e.g, 24.221.13.83	_____ ***Note:*** Enter a customer/WBR IP address **-OR-** a UUID
UUID e.g, 149219	_____ ***Note:*** Enter the WBR's MAC address, per Merlin
Query Type	◉ Standard queries: hybs qpsk tstat qpsk stat qpsk gdump qams hostname hybs so0 hybs so1 (Hold down the 'CTRL' key to select multiple queries) ○ Custom query: _____ ***Note:*** Only administrators can perform custom queries and only supervisors/leads can send *ginit*, *rngpwr*, and *exit* commands.

Submit Request(s)

Warning: This could take up to 30 seconds per query; please be patient

FIG. 38

2097.20 STOT8660

Hybrid Probe - Phoenix

Start date: 12-11-00 Start time: 00:00:00

End date: 12-11-00 End time: 21:34:07

Number of entries: 10

CSV Format ☐

Get Results

Start time: *12-11-00 00:00:00 GMT*

End time: *12-11-00 21:34:07 GMT*

Currently: *12-11-00 21:34:25 GMT*

IP Address	Active - %	Ratio	Poll - Timer	Ded - Timer	Poll - Tx bytes	Ratio	Ded - Tx bytes	Ratio	Index	Ratio
-										
Total (all)	N/A	N/A	0:0:0:0:0	0:0:0:0:0	N/A	N/A	N/A	N/A		N/A
Average (all)	N/A	N/A	0:0:0:0:1	0:0:0:0:1	N/A	N/A	N/A	N/A	1	N/A

FIG. 39

Title: PROBE DEVICE FOR DETERMINING CHANNEL INFORMATION IN A BROA[redacted]D WIRELESS SYSTEM
Inventor(s): [redacted]Dispensa
Serial No. or Docket No.: 09/981,015

Top Talkers

Total Users = 476

Total number of upstream bytes for all users = 37959.79 MB
Total number of downstream bytes for all users = 78291.14 MB

Average number of upstream bytes per user = 79.75 MB
Average number of downstream bytes per user = 164.48 MB

Date Range Searched: From 2001-12-04 00:00:00 to 2001-12-04 23:59:59

CMID	Up MB	% of Total	Information
10113995201	1396.48	3.68	Info Detail
10300017795	1252.04	3.30	Info Detail
10045700301	1185.84	3.12	Info Detail
10043134301	1074.78	2.83	Info Detail
10300024189	952.64	2.51	Info Detail
10045370901	945.70	2.49	Info Detail
10060649801	876.35	2.31	Info Detail
10300049099	861.39	2.27	Info Detail
10048528301	849.71	2.24	Info Detail
10300042276	835.36	2.20	Info Detail
10041614401	779.71	2.05	Info Detail
10080408901	746.92	1.97	Info Detail
10300014579	727.49	1.92	Info Detail
10300039579	702.54	1.85	Info Detail
10044769601	660.30	1.74	Info Detail
10063484801	654.68	1.72	Info Detail
10300067076	635.97	1.68	Info Detail
10043370701	621.19	1.64	Info Detail
10300080498	604.89	1.59	Info Detail
10300013790	569.02	1.50	Info Detail

CMID	Down MB	% of Total	Information
10033145001	4495.26	5.74	Info Detail
10113995201	3860.84	4.93	Info Detail
10300015592	2941.91	3.76	Info Detail
10046161801	2854.52	3.65	Info Detail
10300036933	2353.44	3.01	Info Detail
10300026883	1907.78	2.44	Info Detail
10300049340	1602.27	2.05	Info Detail
10043134301	1551.04	1.98	Info Detail
10026884901	1520.79	1.94	Info Detail
10063273601	1520.67	1.94	Info Detail
10113986301	1489.38	1.90	Info Detail
10300033843	1435.02	1.83	Info Detail
10045370901	1430.11	1.83	Info Detail
10063207801	1381.60	1.76	Info Detail
10300042788	1323.12	1.69	Info Detail
10045140201	1258.60	1.61	Info Detail
10044181901	1210.90	1.55	Info Detail
10113953301	1197.58	1.53	Info Detail
10047055801	1122.13	1.43	Info Detail
10040944301	1094.73	1.40	Info Detail

FIG. 40

Detail Informaiton for CMID 10000002309

Breakdown By Protocol

Protocol	Upstream Bytes	% of Total	Downstream Bytes	% of Total
HTTPS	437990	0	3649130	0
IP	1077630687	99	1089385948	99
Totals	1078068677		1093035078	

Breakdown By IP Address

IP Address	Upstream Bytes	% of Total	Downstream Bytes	% of Total
24.221.206.66	1077630687	99	1089385948	99
24.221.206.71	437990	0	3649130	0
Totals	1078068677		1093035078	

Breakdown of Protocols for IP Address 24.221.206.66

Protocol	Upstream Bytes	% of Total	Downstream Bytes	% of Total
IP	1077630687	100	1089385948	100
Totals	1077630687		1089385948	

FIG. 41

20040705-5010-8650

Statistics for Market ID 00000010, Market name = Phoenix (new)

Bad cmid's encountered = 0

Market ID	Date	HR	# of Subscribers	Mb Per Hour	Avg Per Subscriber	Avg MBPS	Peak # of MBPS
00000010	2000-12-12	00	000003	000000054.53	001817.00	000000.01	000000026.01
00000010	2000-12-12	01	000003	000000158.73	005291.00	000000.04	000000118.64
00000010	2000-12-12	02	000002	000000187.85	009392.00	000000.05	000000102.37
00000010	2000-12-12	08	000001	000000055.31	005531.00	000000.01	000000055.31
00000010	2000-12-12	10	000004	000000140.21	003505.00	000000.03	000000084.61
00000010	2000-12-12	11	000001	000000008.07	000807.00	000000.00	000000008.07
00000010	2000-12-12	12	000004	000000024.41	000610.00	000000.00	000000013.55
00000010	2000-12-12	13	000001	000000002.41	000241.00	000000.00	000000002.41
00000010	2000-12-12	15	000001	000000008.83	000883.00	000000.00	000000008.83
00000010	2000-12-12	17	000001	000000001.28	000128.00	000000.00	000000001.28
00000010	2000-12-12	19	000001	000000025.82	002582.00	000000.00	000000025.82
00000010	2000-12-12	20	000001	000000024.97	002497.00	000000.00	000000024.97
00000010	2000-12-12	21	000001	000000023.37	002337.00	000000.00	000000023.37

Statistics for udfg id 526, udfg name = south mtn 101-32/36

Total subscribers in SIF: 110

Udfg ID	Date	HR	Active Subscribers	MegaBits Per Hour	Avg Per Subscriber Per Second	Peak # of MBPS
526	2000-12-11	00	3	34.30	19.10	27.21
526	2000-12-11	01	5	541.81	180.181	388.12
526	2000-12-11	02	2	128.5	10.85	73.6
526	2000-12-11	03	5	761.39	253.239	731.53
526	2000-12-11	04	2	6.14	5.14	5.75
526	2000-12-11	05	5	442.1	14.221	403.91
526	2000-12-11	06	4	266.43	111.3	159.45
526	2000-12-11	07	2	2.99	2.59	1.94
526	2000-12-11	08	2	486.33	405.33	363.5
526	2000-12-11	09	4	312.11	130.11	221.18
526	2000-12-11	10	3	1111.96	617.136	797.57
526	2000-12-11	11	3	49.74	27.114	27.77
526	2000-12-11	12	4	50.63	21.23	41.30
526	2000-12-11	13	3	281.76	156.96	204.44
526	2000-12-11	14	6	598.4	16.224	319.80
526	2000-12-11	15	3	778.66	432.106	525.49
526	2000-12-11	16	3	12.77	7.17	11.60
526	2000-12-11	17	2	27.20	22.80	26.46
526	2000-12-11	18	5	14.80	4.280	6.12
526	2000-12-11	19	1	1.90	3.10	1.90
526	2000-12-11	20	5	44.86	14.286	35.99

FIG. 42

09981015 051801

Detail for IP nnn nnn nnn nnn from to 2000-12-12 23:59:59

This is a protocol breakdown for traffic from this IP address. This includes all protocol types, including all TCP and UDP protocols. Two special protocols, TCP~ and UDP~, correspond to "unknown TCP protocol" and "unknown UDP protocol". This means that we don't really know what kind of traffic it is at this point.

Protocol	Downstream KBytes	Upstream KBytes

Totals:

Up: Kbytes
Down: Kbytes

Protocol Summary - 2000-12-12 00:00:00 to 2000-12-12 23:59:59

This is a list of the most popular protocols on our network for the chosen date range. Measurements are in Megabytes and the da range is inclusive. Again, TCP~ and UDP~ represent "other" TCP and UDP apps which have not yet been identified.

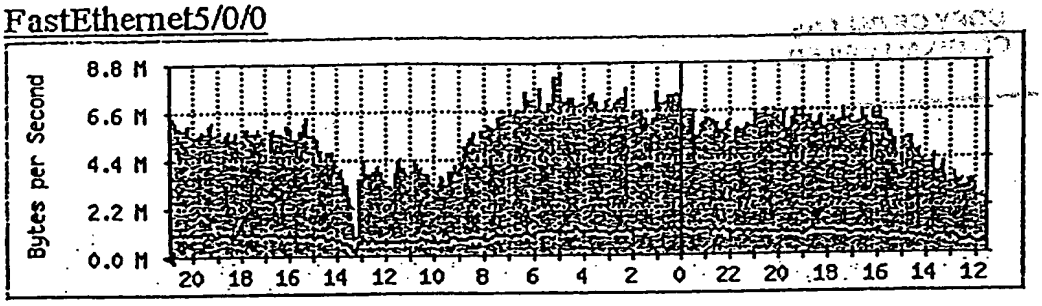
Protocol Name	Megabytes Transferred
NNTP	60997.67
TCP~	20632.16
NAPSTER	10798.85
FTP-DATA	8756.72
HTTP	6938.55
UDP~	3909.48
HTTPS	1215.48
POP3	571.60
AOL	183.04
FTP-CTRL	12.31
REALAUD	10.20
TELNET	8.48
SOCKET	6.92
SQLNET_N	4.31
SUNRPC_T	0.10
COMPUSRV	0.04

FIG. 43

Title: PROBE DEVICE FOR DETERMINING CHANNEL INFORMATION IN A BROA[redacted]ND WIRELESS SYSTEM
Inventor(s): [redacted] Dispensa
Serial No.: [redacted]ket No.: 09/981,015

Router Traffic Analysi
Daily Graph (5 Minute Average)

FastEthernet5/0/0

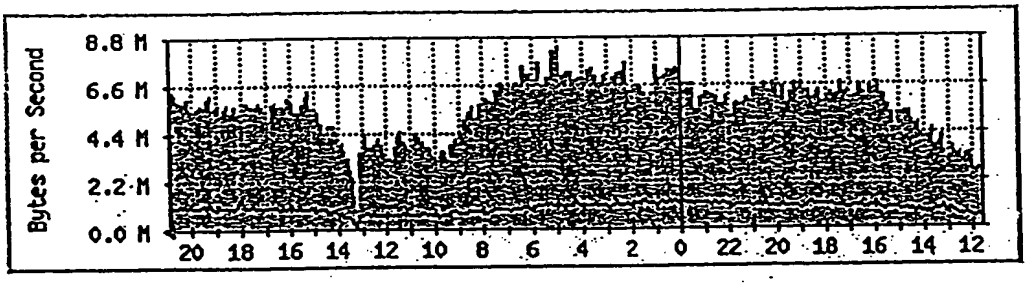


Traffic Analysis for FastEthernet5/0/0
edge01.phoenix.speedchoice.com

System: edge01.phoenix.speedchoice.com in
Maintainer:
Description: FastEthernet5/0/0
ifType: ethernetCsmacd (6)
ifName: Fa5/0/0
Max Speed: 12.5 MBytes/s
Ip: 207.240.93.202 (edge01)

The statistics were last updated **Friday, 15 December 2000 at 21:00,**
at which time **'edge01.phoenix.speedchoice.com' had been up for 84 days, 10:51:32.**

'Daily' Graph (5 Minute Average)



Max In:8409.8 kB/s (67.3%) Average In:5645.1 kB/s (45.2%) Current In:6166.0 kB/s (49.3%)
Max Out:1446.9 kB/s (11.6%) Average Out: 944.8 kB/s (7.6%) Current Out: 1017.5 kB/s (8.1%)

FIG. 44

20512015660

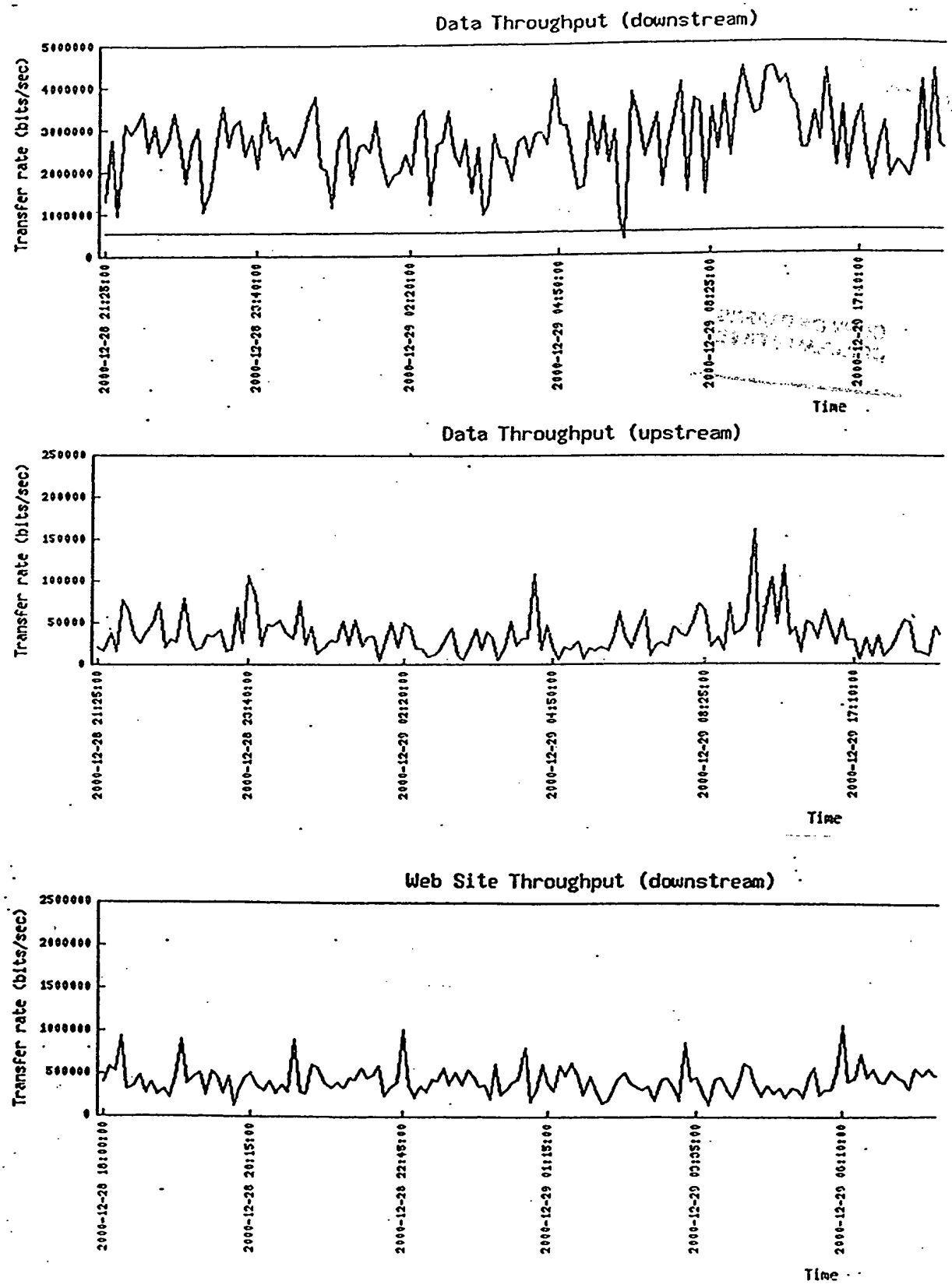
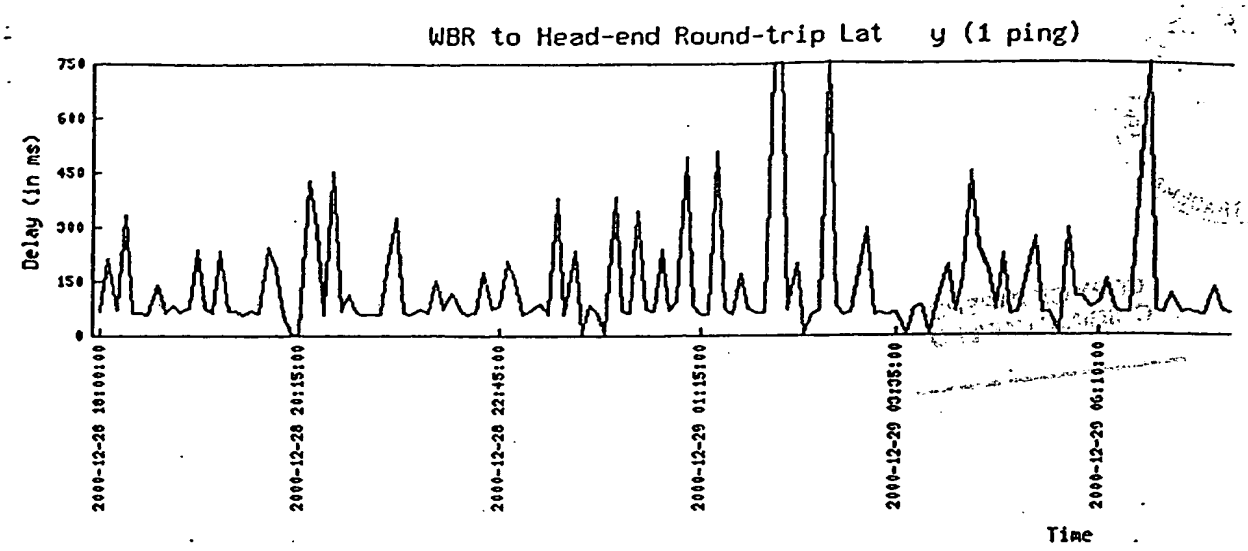
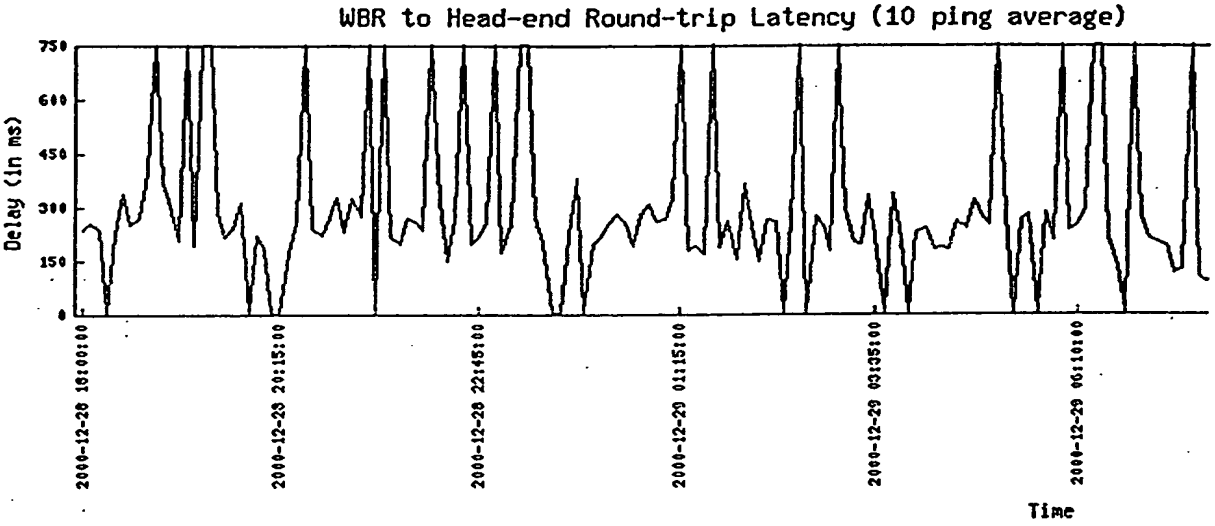

Sector sm102-32
Data Throughput (downstream)
Transfer rate (bits/sec)
5000000
4000000
3000000
2000000
1000000
0
2000-12-28 21:25:00
2000-12-28 23:40:00
2000-12-29 02:20:00
2000-12-29 04:50:00
2000-12-29 08:25:00
2000-12-29 17:10:00
Time
Data Throughput (upstream)
Transfer rate (bits/sec)
250000
200000
150000
100000
50000
0
2000-12-28 21:25:00
2000-12-28 23:40:00
2000-12-29 02:20:00
2000-12-29 04:50:00
2000-12-29 08:25:00
2000-12-29 17:10:00
Time
Web Site Throughput (downstream)
Transfer rate (bits/sec)
2500000
2000000
1500000
1000000
500000
0
2000-12-28 18:00:00
2000-12-28 20:15:00
2000-12-28 22:45:00
2000-12-29 01:15:00
2000-12-29 03:35:00
2000-12-29 06:10:00
Time

FIG. 45


WBR to Head-end Round-trip Lat y (1 ping)
Delay (in ms)
750
600
450
300
150
0
2000-12-28 18:00:00
2000-12-28 20:15:00
2000-12-28 22:45:00
2000-12-29 01:15:00
2000-12-29 03:35:00
2000-12-29 06:10:00
Time


WBR to Head-end Round-trip Latency (10 ping average)
Delay (in ms)
750
600
450
300
150
0
2000-12-28 18:00:00
2000-12-28 20:15:00
2000-12-28 22:45:00
2000-12-29 01:15:00
2000-12-29 03:35:00
2000-12-29 06:10:00
Time

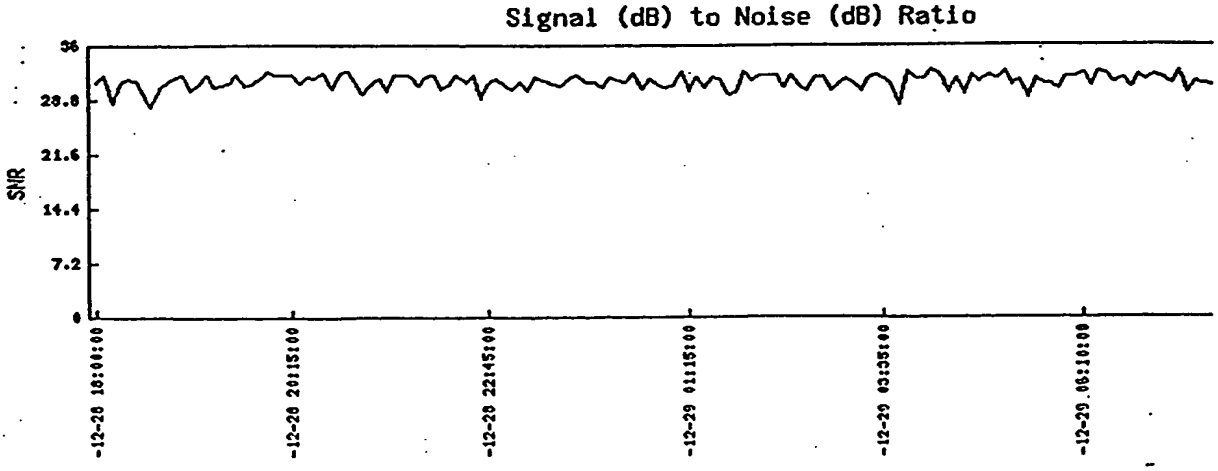

Signal (dB) to Noise (dB) Ratio
SNR
36
28.8
21.6
14.4
7.2
0
-12-28 18:00:00
-12-28 20:15:00
-12-28 22:45:00
-12-29 01:15:00
-12-29 03:35:00
-12-29 06:10:00

FIG. 46

09981015 - 052101

Peak Time: 2000-12-28 12:25:00 CST

Peak Active Modems	Sampled Modems	Activity Ratio
905	7115	12.72%

Modem Counts		
Contention	Polling	Dedicated
0	847	58

Off Peak Time: 2000-12-28 06:00:00 CST

Off Peak Active Modems	Sampled Modems	Activity Ratio
152	7115	2.14%

Modem Counts		
Contention	Polling	Dedicated
0	98	54

Individual Peak Modem Counts

Contention	Polling	Dedicated
2000-12-28 12:55:00 CST	2000-12-28 12:25:00 CST	2000-12-28 05:45:00 CST
10	847	88

Avg. Time Spent Per User

In Contention	In Polling	In Dedicated
0.03 secs	0.71 secs	1.48 secs

FTP Rates At Off Peak 2000-12-28 06:00:00 CST		FTP Rates At Peak 2000-12-28 12:25:00 CST	
Downstream	Upstream	Downstream	Upstream
3.54 Mbps	85.83 Kbps	2.21 Mbps	32.02 Kbps

FIG. 47a

Peak FTP Rate Downstream
2000-12-28 07:20:00
6.03 Mbps

Peak FTP Rate Upstream
2000-12-28 07:20:00
217.87 Kbps

2000-12-28 00:00:00 CST thru 2000-12-28 23:59:59 CST

Average FTP Rate Midnight-6pm (off peak)		Average FTP Rate 6pm-Midnight (peak)	
Downstream	Upstream	Downstream	Upstream
2.69 Mbps	51.31 Kbps	2.01 Mbps	38.27 Kbps

2000-12-28 00:00:00 CST thru 2000-12-28 23:59:59 CST

Average HTTP Rate Midnight-6pm (off peak)	Average HTTP Rate 6pm-Midnight (peak)
470.34 Kbps	384.46 Kbps

FEC Corrections	FEC Uncorrectables
32.55 : 1000	1.53 %

Available Channels		
230		
Max Functioning Channels	Min Functioning Channels	Avg Functioning Channels
230	68	226.44
Max Non-Functioning Channels	Min Non-Functioning Channels	Avg Non-Functioning Channels
162	0	3.56

Signal to Noise Ratio

24.93 : 1

Requested to Scheduled Modem Calibration Ratio

0.65 : 1

Downstream to Upstream Bitrate Ratio
(All MEASUREMENTS ARE PER USER)

02:00:00 - 02:15:00 CST	10:00:00 - 10:15:00 CST	14:00:00 - 14:15:00 CST	22:00:00 - 22:15:00 CST
4.01 : 1	4.46 : 1	10.68 : 1	4.56 : 1

12-28

FIG. 47b

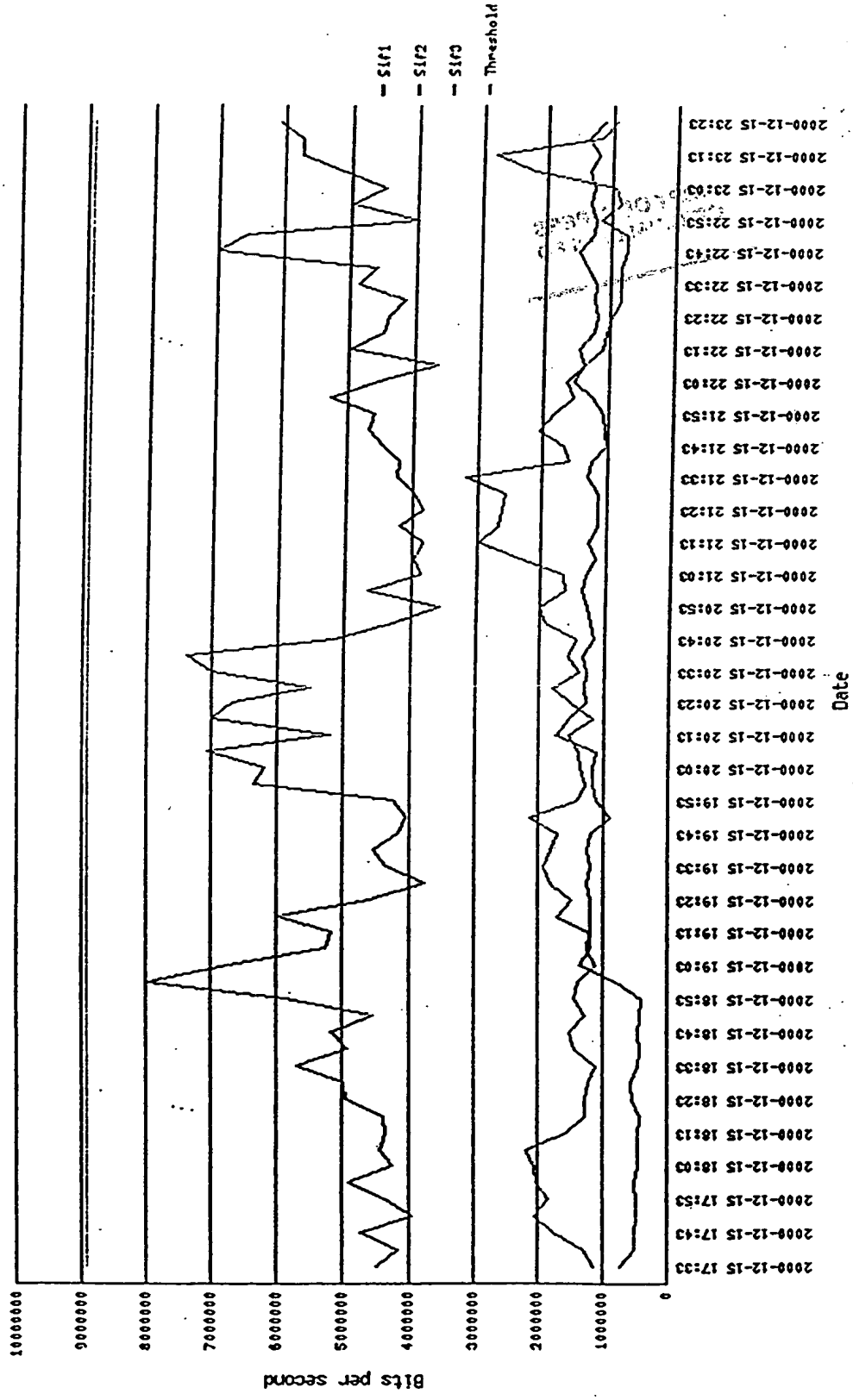

hc01
Slf1
Slf2
Slf3
Threshold
bits per second
10000000
9000000
8000000
7000000
6000000
5000000
4000000
3000000
2000000
1000000
0
Date
2000-12-15 17:33
2000-12-15 17:43
2000-12-15 17:53
2000-12-15 18:03
2000-12-15 18:13
2000-12-15 18:23
2000-12-15 18:33
2000-12-15 18:43
2000-12-15 18:53
2000-12-15 19:03
2000-12-15 19:13
2000-12-15 19:23
2000-12-15 19:33
2000-12-15 19:43
2000-12-15 19:53
2000-12-15 20:03
2000-12-15 20:13
2000-12-15 20:23
2000-12-15 20:33
2000-12-15 20:43
2000-12-15 20:53
2000-12-15 21:03
2000-12-15 21:13
2000-12-15 21:23
2000-12-15 21:33
2000-12-15 21:43
2000-12-15 21:53
2000-12-15 22:03
2000-12-15 22:13
2000-12-15 22:23
2000-12-15 22:33
2000-12-15 22:43
2000-12-15 22:53
2000-12-15 23:03
2000-12-15 23:13
2000-12-15 23:23

FIG. 48